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# QST



## The Official Organ of the A.R.R.L

VOLUME XIV

DECEMBER, 1930

NUMBER 12

Published in two sections of which this is Section I

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QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A.  
Official Organ of the A.R.R.L. and the International Amateur Radio Union

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Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, \$2.50 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, \$3.00 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1920, under the Act of February 28, 1925.

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# EDITORIALS

**WE** HAVE a birthday! Fifteen years ago this month, when the American Radio Relay League was only a year and a half old, the first issue of *QST* was brought out. Published privately by Hiram Percy Maxim and Clarence D. Tuska, the founders of the League, in response to the need which had been found for some sort of regular bulletin, its object was "to help maintain the organization of the A.R.R.L. and to keep the Amateur Wireless Operators of the country in constant touch with each other." That has been its aim ever since.

There is just one copy of this precious first issue at Headquarters. We dug it out of the safe to-day and had a look at it for the first time in years. Old and battered, what joyous memories this little blue-covered booklet of twenty-four pages brought back to us! Your present editor was a young lad back in Illinois in those days, struggling with the intricacies of "wireless" and rapidly getting nowhere at all. *QST* came as manna from heaven. And did we know whether we wanted to subscribe or not! The publishers hoped that after financing three issues the magazine would find enough response to carry itself. They advertised that "Every amateur will help himself and help his fellows by sending in twenty-five cents for a three-months trial subscription." Our two bits, we remember, started for Hartford that same day, and there were enough others who thought the same way to carry *QST* on to its present indispensable position in our radio lives.

How we realize our venerable age when we let it sink in that all that was fifteen years ago! And what perfectly tremendous changes there have been since then! Those were the toddling days of amateur radio, when all transmission was by spark, with the rotary gap gaining favor, when most reception was on crystal detectors, with a few fortunate amateurs owning "audions." Let us pause and shed a tear for those childhood days when life was simpler. Honestly, they were swell in many ways!

The first issue of *QST* had ten pages of reading matter and seven pages of paid advertisements, with the rest given over to data and notices. The war was on in Europe and the United States

was becoming national-defense conscious. We find the President of the League writing to the Secretary of War and the Secretary of the Navy, offering the facilities of the League. Editor Tuska comments that "The great possibilities of the American Radio Relay League, with its organization of over six hundred relay stations in nearly every state of the Union, are bound to attract prominent attention." In that first issue, too, *QST* started its campaign for "precise, orderly and efficient" traffic handling. "Reliability & Celerity" was a slogan of the day — only the printer spelled it "celebrity." Regular hours for working were stressed by the editor, for, "unless the other man is a regular nighthawk and sits up half the night every night in the week, he misses him."

The leading (and the only) technical article in this issue was "Pictured Electro-Magnetic Waves," by Clarence D. Tuska, Assoc. I. R. E., he who was our first secretary and editor. Talk about technical, you fellows who think *QST* is "too technical!" It started out that way. This article was very much too technical, with all those queer pictures of electro-magnetic and electro-static strain lines around a vertical antenna — you know, those funny diagrams we never could understand. There was other technical material, too, in the way of photos of several stations of members. Three pages were given over to a list of new members of the League, every one with call letters but a few of them still self-assigned initials, for the radio law was not yet operating in remote sections of the country. Members in those days had to fill out a two-page questionnaire in making application. DX was but a few miles and a man's equipment had to be known before his desirability as a relay station could be deduced. Applicants had to describe their aerials, including "number of wires in aerial and space between," and answer "Do you use a spark coil or transformer?" and "Is your spark gap rotary, fixed or quenched?" The League advertised for sale its "List of Stations Book," tabulating the relay stations of the A.R.R.L. This book "shows what relay stations are within your range; gives name of owner, complete address, call letters, sending power, kind



of gap used, number of words can receive per minute, listening-in hours, what license is held, telephone connection or not." That, folks, was the forerunner of the Handbook.

But the "ads" in that first number! You youngsters who know amateur radio only in terms of high-frequency tube transmission and screen-grid detection and are bored stiff with any DX under ten thousand miles really missed a lot, and don't you forget it. What grief the old-timers encountered, what a rotten ratio of dollars-per-mile their investments gave them! But what real thrills were theirs when the old junk-pile did percolate and they clicked with another equally thrilled chap at the tremendous DX of 278 miles! Believe it or not, it all happened. So in this first issue of *QST* we find advertisements of the apparatus of the day. Prominent is the rotary gap, "required in every transmitting station by the Federal authorities" because "this type of gap produces a pure wave of low damping decrement," a note that "cannot be mistaken for static." Hi! And do you remember the very essential double-pole double-throw switch to short the 'phones while sending, to keep from burning your ears off! Then there was a Universal Detector Stand, "capable of holding crystals up to and including  $\frac{3}{4}$ ." No, not quartz plates, but rectifying crystals for detectors. This one was a complicated gadget with a hollow standard, a ball, a spring, a thumb-screw, an arm, a set-screw and a few more jiggers, so made that it "remains permanently in adjustment under jars and vibrations of every description." You poor moderns who never had a real hot argument as to whether it was better to use a silicon detector with a hard blunt point or a galena crystal with a cat-whisker made of a strand of iron wire taken from a piece of what used to be called "picture wire" — you missed a really precious part of amateur life.

There were many other interesting ads, too: Duck's Big Wireless Catalog, on which so many

of us of that day were raised; Arnold's loose-coupler guaranteed to "tune up to 3500 meters on a fair size Antenna"; that ingenious microphone amplifier, the Multi-Audi-Phone, with its typical testimonials; several brands of 'phones; a page of Mignon's original and very pretty long-wave receivers — and just one advertisement of an audion detector. And there was a "straight-line key" with the merit that "fading signals caused by varying resistance of contact points are entirely eliminated."

What a story of radio progress and amateur accomplishment is presented by the pages of *QST* for the past fifteen years! To get a startling comparison one has only to contemplate the small transmitter described in our columns last month, apparatus which, at a total cost of forty-five dollars including power supply and tubes, will send signals half way around the world. When our first issue appeared this money would just about pay for a one-inch spark-coil transmitter, normal DX five city blocks, world's record ninety miles — with nobody able to understand how the chap had done it. Of course there was romance aplenty in the crash of a good blue-white spark, and wet-nursing an electrolytic interrupter was an excellent apprenticeship in radio engineering, but nowadays we use our watts for communicating instead of for the creation of heat, light and sound. We look back with justifiable pride upon those fifteen years and the part that *QST* has played in their development. *QST* has an enviable position in radio literature to-day, a place which demonstrates the soundness of the fundamental ideas of our founders. Ours is a coöperatively maintained magazine, successful because every one of us, as members of the League, feels a personal interest in *QST* and does his bit to help. It is a splendid example of the ability of American amateurs to build together, something of which we think each one of us can be proud to-day.

K. B. W.

## Strays

The annual index to *QST* for 1930 (Volume XIV) has been published as the second section of the December number, and sent to every member of the League. Newsstand readers may obtain a copy of this index for 4 cents in stamps.

*QST*'s unusual cover illustration this month comes as a contribution from the Radio and Television Institute, of Chicago. It is the work of Mr. P. E. Willman, art director of that school, and was provided through the kind coöperation of Mr. F. H. Schnell, their chief of staff, to both of whom grateful acknowledgment is made.

A newspaper write-up on a BCL set mentions the fact that it has a total of seven tubes, including the *pacifier* tube. Evidently the Milkotron has found a commercial application already!

An interesting booklet entitled "The Photo-lytic Cell" is being published by the Photo-Electric Division of the Areturus Radio Tube Company, Newark, N. J. There are five chapters, devoted to discussions on photo-electric phenomena, present-day photo-electric cells, the photo-lytic cell, the light source, and amplifiers. The price is twenty-five cents.

W3LA wants to know when the broadcast stations are going to have automatic power controls 180 degrees out of phase with natural fading!

## A Two-Tube A.C. Receiver

By George Grammer, Assistant Technical Editor

THOSE who follow the trend of amateur radio in *QST* cannot help but be conscious of two important developments in receiver construction. We refer, of course, to the a.c.-operated receiver and the screen-grid detector. Several times in the past year the thorough practicability of the a.c. receiver has been pointed out; and the testimony of Rydberg, Doty and other experimenters, as well as the graphical study by Robinson, certainly must have convinced the most skeptical that the screen-grid detector is capable of greater sensitivity than the triode.

Some experiments in the *QST* laboratory with screen-grid detectors convinced us that, for c.w. reception at least, a two-tube receiver will give all the sensitivity and volume that the average amateur requires—speaking, of course, of the man who prefers to wear 'phones instead of receiving via the loud-speaker. Admittedly more care is needed in stringing the receiving antenna and adjusting it for best results when the detector is not isolated from it by a coupling tube; but the chap who is willing to give the antenna question a little attention will have few difficulties.

Aside from the greater sensitivity of the Type '24 tube as a detector and the consequent desirability of using it with any type of receiver, there is a great deal of satisfaction in being able to plug into a light socket to get power to run the set—and know that there is no battery to be charged after several hours of continuous operation.

We must confess, however, that there is one thing lacking in the receiver. When planning the set a means of controlling volume was not given a thought, since it was not expected that two tubes would give more than comfortable signal strength. It should have been incorporated, however, because the set really needs one. The "sock" of many ham signals is too great for real comfort, especially with a good receiving antenna.

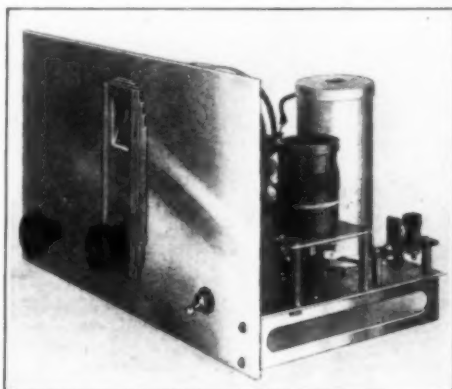
The circuit is the "old standby" regenerative

detector and one stage audio, capacitively coupled to the antenna, and with such modifications as are necessary or desirable for a.c. tubes. Most amateurs need no introduction to this arrangement, having used it at one time or another in their "ham" experience. A diagram is shown in Fig. 1, and the various photographs show the arrangement of the apparatus.

The panel is a piece of  $\frac{1}{8}$ -inch sheet aluminum, 7 inches high and 12 inches wide. On it are mounted the drum dial which controls the tuning condenser, the regeneration control resistor, and the "B" cut-off switch.

The remaining apparatus is mounted on the sub-panel, which is also sheet aluminum, 12 inches wide and 6 inches deep. The sub-panel mounting brackets (Silver-Marshall) are one inch high. The sub-panel method of construction is used for several reasons, chief of which is the desirability of separating the r.f. and power wiring as much as possible and shielding them from each other. The metal sub-panel accomplishes both these things. In addition practically all wiring is concealed, with the result that the receiver presents a neat appearance when being exhibited to visitors.

Three five-prong sockets are required, one for the plug-in coils and two for the tubes; the variety used in this particular set are sub-panel sockets of the type widely used by broadcast-receiver manufacturers. It is not necessary to use the same style, of course, although they lend themselves nicely to sub-panel wiring and are inconspicuous. Some of the mail-order houses carry them if they are difficult to obtain locally. However, substitution of the garden variety of socket will add few difficulties to the construction and will affect the performance not a whit. As a matter of fact, the same is true of most of the other apparatus in the set; parts that are incorporated in it, with the exception of only one or two items, were used simply because they were available or because they had a pleasing appearance—worthy enough reasons for any constructor, but



THE FRONT PANEL AND PART OF THE "CHASSIS"

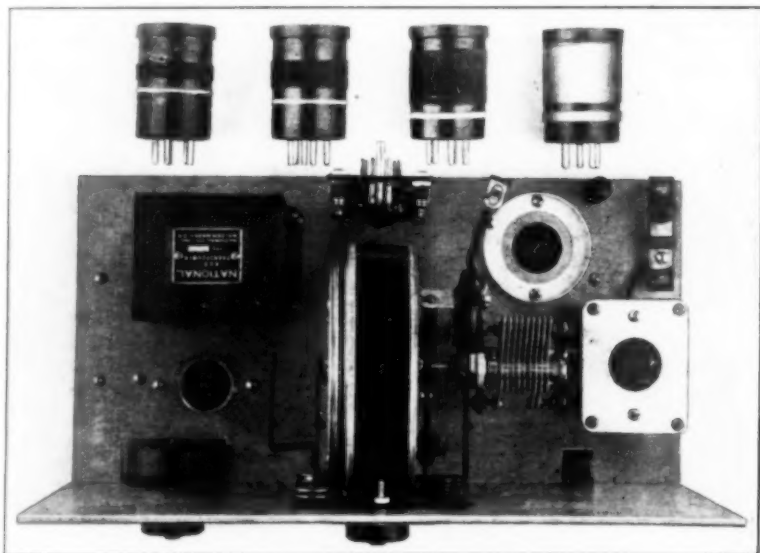
This photograph shows the detail of the coil and antenna condenser mountings. The detector tube shield is also visible.

having very little to do with the actual electrical performance of the set. On the other hand, a different tuning condenser and a dial not of the drum type will probably necessitate an entirely different layout for the receiver. The same constructional principles will apply in any case; so that even though a radical change in the layout is made there need be no sacrifice of efficiency.

The tuning condenser is a National Type SE-100 with several plates removed for band-spread-

and tuning condenser. The mounting for the coil socket is made from a piece of  $\frac{1}{16}$ th-inch aluminum 2 inches by  $2\frac{1}{2}$  inches, supported at each corner by brass sleeves  $1\frac{3}{8}$ " long bolted to the sub-panel.

The antenna coupling condenser is mounted on a 2-inch strip of bakelite which is supported above the sub-panel by two spacers sufficiently long to give ample clearance for the screws holding the condenser and antenna binding post. The con-



THE TOP OF THE SUB-PANEL

*The audio coupler, audio amplifier tube socket and regeneration-control resistor are to the left of the drum dial. Connections are brought out to the cable socket to the rear of the dial. Tip-jacks for the 'phones are mounted on this socket. This photo also shows the method of mounting the tuning condenser, grid condenser and leak, and shows the coil socket and antenna condenser mountings from another angle. The ground binding post is mounted on the sub-panel between the detector tube socket and the antenna condenser.*

ing. The drum dial is a National Type HS, which is the projector dial with special mounting brackets for the Type SE condenser. To the right of the condenser, as shown in the top view of the receiver, is the mounting for the coil socket, and just behind the latter is the mounting for the antenna coupling condenser and the antenna binding post. The reason for these two special mountings is obvious when it is remembered that the sub-panel is metal. There are really several reasons for the special coil socket mounting, however. First of all, with the type of socket used all the connections would have had to be made *under* the sub-panel if the socket had been mounted directly on it; this was undesirable because all r.f. wiring should be above the sub-panel, insofar as possible, to isolate it from the other wiring. Raising the socket keeps the r.f. wiring above the sub-panel, and in addition makes possible short, direct leads between coil socket

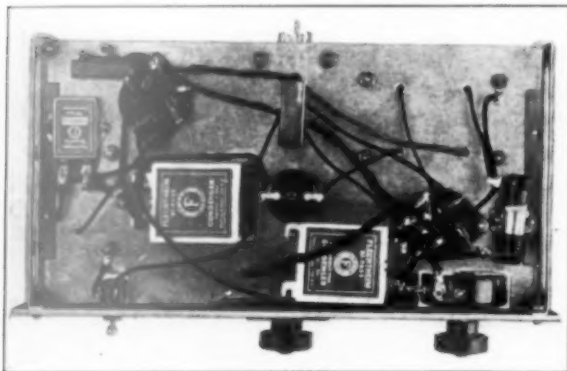
and tuning condenser. The mounting for the coil socket is made from a piece of  $\frac{1}{16}$ th-inch aluminum 2 inches by  $2\frac{1}{2}$  inches, supported at each corner by brass sleeves  $1\frac{3}{8}$ " long bolted to the sub-panel. The antenna coupling condenser is mounted on a 2-inch strip of bakelite which is supported above the sub-panel by two spacers sufficiently long to give ample clearance for the screws holding the condenser and antenna binding post. The antenna coupling condenser itself consists of two strips of thin brass about a half inch wide, bent as shown in the photograph. One strip, a simple right-angle bend, is held in place by the antenna binding post; the other is fastened to the bakelite strip by a small machine screw and nut. This piece is bent around the vertical portion of the other strip in the form of a narrow "U". The separation between the two is about  $\frac{1}{16}$ th inch. Greater or less coupling may be desirable in certain cases; the larger the capacity of the condenser the greater is the signal strength, within limits, but as the capacity is increased the selectivity decreases, so that a compromise between signal strength and selectivity is necessary to suit individual tastes. In general, with a good-sized receiving antenna the condenser should be small; with a short indoor antenna more capacity is allowable. The size shown is satisfactory for a medium-sized antenna (length about 50 feet).





ing as possible, and the leads to the heaters of the tubes and the dial light are as far from other wiring as the necessary placement of parts will permit. These leads, carrying 2.5 volts a.c., are twisted to reduce hum troubles from stray a.c. fields.

The end view of the receiver shows two wires from the coil socket going through the sub-panel. These are the tickler leads, and they may be seen



UNDER THE SUB-PANEL

The center-tapped resistor for the heater leads is mounted directly underneath the ground binding post. The small condenser to the left is the plate by-pass condenser; the one below the detector tube socket is the screen-grid by-pass condenser. The r.f. choke is in the center. The cathode resistor for the '27 is at the extreme right, held in place by a home-made bracket. The by-pass condenser across the resistor is mounted between the r.f. choke and the front panel. The metal piece behind the r.f. choke is a bracket which rests on the table and serves as a mechanical support for the sub-panel.

at the left in the bottom view. One, the B plus side, goes to the 200- $\mu$ fd. plate by-pass condenser, and the other goes directly to the plate terminal on the detector tube socket.

Aside from these two r.f. wires and the heater leads, the arrangement of the parts and the other wiring is largely a matter of getting things to fit in. There are no particular precautions to be observed in laying out the audio frequency equipment and wiring nor the "B" leads.

#### COIL ADJUSTMENTS

The coils are wound on 5-prong manufactured forms  $1\frac{1}{2}$  inches in diameter. The specifications given are not to be followed too religiously, because undoubtedly there will have to be cutting and trying to get the bands to come within the desired limits on the dial scale and to get smooth control of oscillation. Probably the best plan to follow is to wind each of the coils with two or three turns more than specified; then, with the detector tube and antenna which will be used for regular reception, adjust the size of the antenna coupling condenser for best results; following this the coils themselves may be operated upon, if necessary. Since the size of the tickler coil affects the tuning range to some extent, it is well

to get the tickler fixed up first, after which small adjustments may be made to the grid coil to get the band on the dial. The coils should be adjusted so that the center of each band comes at about the center of the dial scale.

The adjustment of the tickler size is important if maximum signal strength is to be secured. A Type '24 screen-grid detector gives the best signals when the actual voltage on the screen is approximately 22. Therefore every effort should be made to so adjust the tickler that the voltage on the screen will be 22 and not 10 volts or 40 volts. This is most easily done by first putting on a few more turns than will be needed; then, with the screen-grid lead connected to the 22-volt tap on the "B" battery or eliminator (if the latter make sure that the voltage is actually 22), take off tickler turns one at a time until the tube just oscillates with the regeneration-control resistor set so the resistance is all cut out. This adjustment should be made with the antenna and ground connected to the set because more screen-grid voltage is required to make the detector oscillate when the antenna is connected, and the object is to find the correct number of tickler turns to use under normal operating conditions. Then with 45 volts on the screen-grid tap the regeneration control resistor will be at about half scale for oscillation.

The size of the grid leak will have some effect on the smoothness of oscillation.

In general, louder signals and smoother oscillation control will result if the resistance of the leak is as high as possible. 10 megohms is a good value; with less than 5 megohms the signal strength may drop off somewhat and the tube is likely to go into oscillation with a thump instead of "sliding" in.

#### THE AUDIO AMPLIFIER

Because of the high plate impedance of the screen-grid detector ordinary audio coupling transformers cannot be used, nor can the 'phones be placed directly in the detector plate circuit with satisfactory results. The National Screen-Grid Coupler used in this set is excellent for the purpose. Resistance coupling may be used, of course, in which case the resistor in the plate circuit of the detector should have a value of about 200,000 ohms. The signal strength will usually be greater with impedance than resistance coupling, and less plate voltage is required because of the smaller voltage drop through the impedance. The values of  $C_7$  and  $R_6$  will be the same with either resistance or impedance coupling. A good coupling impedance for the plate circuit of the '24 may be made by connecting the primary and secondary of an audio transformer



in series; if this is done a good-quality transformer should be used. Peaked amplification may be used as well, substituting a tuned impedance for  $L_a$  — a manufactured peaking device such as the Aero Hi-Peak will function satisfactorily. A peaked amplifier will help out considerably in reducing hum if hum is noticeable.

Automatic bias, supplied by the resistor  $R_3$  in series with the cathode of the Type '27 amplifier, maintains the grid of the amplifier at the correct operating point.  $R_3$  does not seem to be very critical, and 2000 ohms is a good value. The audio by-pass condenser,  $C_6$ , across the bias resistor may be omitted if desired, although its use increases the signal strength noticeably. It also increases the hum level in the same ratio, however.

The size of the r.f. by-pass condenser,  $C_6$ , is likely to have a considerable effect on the signal strength. The reactance of a condenser of even .001- $\mu$ f. capacity (a common size of r.f. by-pass condenser) is low enough, compared to the impedance of the coupling device, to shunt a considerable portion of the audio energy away from the grid of the amplifier.  $C_6$  should not be larger than 250  $\mu$ f.

The shield about the detector tube requires some explanation, since it is not required for any reasons of receiver efficiency. When the set was first built a quite strong "induction" hum (distinctive as compared with filament hum because of its high pitch) was present — not a hum caused by a.c. operation of the tubes, since it was just as strong when the receiver was entirely d.c. operated. A little experimenting uncovered the cause. The house wiring itself set up a strong field to which the receiver was of course subjected. So long as the grid of the detector was connected to the filament through a high-resistance leak the induction hum was strong, although on shorting out the grid leak it disappeared. Naturally the hum could only be present when a difference of potential could exist between grid and filament, and the logical way to bring both to the same potential — with respect to the induction field — was to connect the grid directly to the filament, which obviously could not be done, or to shield the tube. The latter was done and the induction disappeared almost entirely. The only point of pickup at present is the short length of grid lead from the grid condenser to the cap of the tube. The pickup from this lead is so small that it was not deemed necessary to shield it.

#### ANTENNA EFFECTS

There are a few disadvantages resulting from coupling the detector tube directly to the antenna, most of which can be overcome with care. One of these is the effect of the antenna on receiver tuning. Unless the antenna is tightly strung and rigidly supported there will be a waver in incoming signals when the antenna swings in

the wind. This is unlikely to happen with an indoor receiving antenna. A change in antennas will almost certainly change the calibration of the receiver, even though the bands may still be entirely within the limits of the dial scale. If the antenna coupling condenser is fairly large the selectivity of the receiver may suffer. For distant reception with an oscillating detector this is no disadvantage, but it is important with 'phone reception when the detector is not oscillating or if

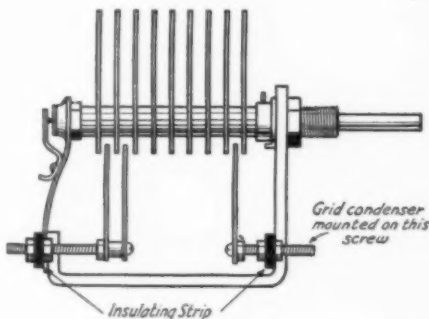


FIG. 2. — HOW THE TUNING CONDENSER IS REMODELLED

The stator is made into two sections, insulated from each other, one consisting of a single plate and the other of two plates.

there are stations nearby whose signals are likely to "blot out" part of the band.

These things may be overcome in the receiver itself by the addition of an antenna coupling tube. On the other hand, the coupling tube adds comparatively little to the signal strength, and if the precautions with regard to the construction of the antenna and the coupling condenser are kept in mind little trouble will be experienced.

The question of "dead spots" is also important. If the fundamental or a harmonic of the antenna happens to resonate at some spot within the tuning range of the receiver it may be difficult, if not impossible, to make the detector oscillate in the vicinity of such resonance points. Lowering the capacity of the coupling condenser will generally help, although this often results in loss of signal strength on either side of the dead spot. The best remedy is to change the length of the antenna so that dead spots do not appear on any of the amateur bands. No exact specifications can be given, but a little experimenting with different antenna lengths will usually result in determination of a satisfactory length. When this has been done the regeneration control need hardly be touched to cover any one band unless it is desired to keep right on the very edge of regeneration.

While the set is built primarily for a.c. operation of the filaments, either batteries or "B" substitutes may be used for the plate and screen-

grid voltages. Many "B" substitutes, while entirely adequate for broadcast receivers or audio amplifiers, fall down miserably when used with short-wave receivers with oscillating detectors. This receiver works well with 135 volts of "B" batteries, and since the total current drain is only of the order of 5 or 6 milliamperes, the batteries will last a long time. In fact, the signal strength with only 90 volts on the detector plate is only slightly less than with 135. Some "B" substitutes give excellent results — if a well-filtered one is

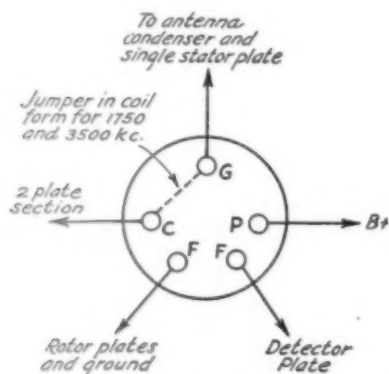


FIG. 3. — COIL FORM AND SOCKET CONNECTIONS

available a quick trial will show whether or not it is suitable. In one instance the hum with a particular "B" substitute was less than when batteries were used for the plate supply — probably due to some "hum-bucking" effect. One difficulty with "B" substitutes, however, even though they may be entirely satisfactory from the standpoint of hum elimination, is that variations in the line voltage may cause the signals to waver in the same way as a swinging antenna.

The amount of filament hum in the receiver seems to be almost entirely a function of the detector tube. Ordinarily the audio amplifier introduces no appreciable hum — if the audio tube alone hums it is a sign of a defective tube or wrong connections in the set. The center-tapped resistor across the heater leads eliminates most of the hum very effectively.

Detector tubes, however, will probably be found to vary considerably. With a good one the hum will be so low in volume that the 'phones have to be pressed tightly to the ears to hear it at all; with others it may be strong enough to be annoying. With average tubes the hum is usually so far below the signal and background level that it is not noticeable — in fact, it is usually necessary to disconnect the antenna to hear it with the tube oscillating. With some detector tubes it will be found that although a very weak hum may be heard with the tube not oscillating, this disappears entirely as soon as the tube goes into os-

cillation. With other tubes the reverse may be true. Since tube manufacturers are constantly striving to improve their product, it is reasonable to expect that less difficulty with hum will be experienced as time goes on. With only a small percentage of '24's will the hum be sufficiently strong to be bothersome unless the operator is excessively critical. The worst feature of a poor tube is the modulation it puts on the incoming signals. With such a tube no signals will be pure d.c.; if such is the case it is a sure indication that the tube is a "modulator" as well as a detector. Oddly enough, the amount of audible hum seems to be unrelated to signal modulation; a "modulator" tube may be perfectly quiet, and on the other hand a tube with a comparatively high hum level may not modulate the signals at all.

With this particular receiver, there was no difference in the amount of hum either with or without a ground connection, so long as the center-tap of the filament resistor was connected to the metal frame of the set, to which the negative "B" is also connected.

The switch in the negative "B" lead is a practical necessity if a transmitter is used and the operator does not care to have his ears deadened every time the key is pressed. A filament switch would be of little value, since the tubes continue to operate for some time after the filament current is turned off, and the time required for them to heat to an operating temperature after the current is switched on would make practical communication impossible.

In conclusion, we can say without qualification that the signal strength with a simple set of this type will surprise anyone not familiar with the results obtainable with screen-grid detectors. Many amateurs claim that a screen-grid detector and one stage of audio amplification is the equal of a detector and two audio stages using Type '01-A tubes. Even if the gain is not so great as that, it is certain that two tubes in such a rig will give much louder signals than the corresponding "detector and one step" — with a much greater gain in sensitivity to the weaker signals.

## Strays

W9FUR informs us that a very good map of the world can be purchased from the National Geographic Society, Washington, D. C., for one dollar. It is laid out in such a way that DX measurements are easily made.

The following was sent us from the *Eric Dispatch-Herald* of February 23, 1930, by Raymond Wagner:

"Sale — Aero call short-wave converter, must be water-heater; gent's bicycle, 30-inch wheels, child's auto, large wheels, an old-fashioned bed, Freid-Eisman radio and speaker."

Someone, please page Warshawsky.

# Amateur Radio at Eastern States Exposition

By Clinton B. DeSoto

**W**HAT about that d.c. signal signing W1ESE you heard during the week of September 14th-20th last fall? It wasn't listed in any call book and . . . you're right! There's a story behind it all. Here it is:

The call W1ESE derived both its initials and its existence from the Eastern States Exposition, "America's premier industrial and agricultural exhibition." The station, which was part of an extensive program of cooperation between Junior Achievement, Inc. and the A.R.R.L., was set up in a booth in Junior Achievement Hall, on the exposition grounds at West Springfield, Massachusetts.

know, is a national organization that provides programs of work for boys and girls of cities and towns, along lines of industry, commerce and homemaking. The work it does for urban boys and girls is similar to that done in rural areas by the national 4-H Club groups. With these aims, and because of its extended field of activity, the inclusion of amateur radio as one of its constructive programs was logical, and the details of cooperation with the League together with a plan for development were first begun in April and May of this year, when Assistant Secretary A. L. Budlong and Mr. Frank W. Barber, Counselor in Field Service of Junior Achievement, held a series of conferences.



W1ESE AND THE OPERATING STAFF

Left to right: Phillip Gould, W1ALZ; John R. Blum, W8CKC, chief operator; Howard Barton, W8IH; Robert H. Peterson, W1LI; and the author. The big variable condenser in the lower right-hand corner is used in the tank circuit of the modulated final stage of W8IH, high-powered 'phone at LeRoy, N. Y.

The other principal part of this program was the instruction of a selected class of boys gathered from all the Eastern states, between the ages of fourteen and twenty, in the art of amateur radio; teaching them the code, and delivering a planned series of talks by members of the Headquarters staff on the different portions of the course of study.

Junior Achievement, as many of you may

The annual national exhibit of Junior Achievement clubs together with their products and activities is held during the Eastern States Exposition, in the large building owned by Junior Achievement. Inasmuch as this is the principal national event held by the organization during the year, it devolved upon A.R.R.L. to cooperate fully in the new program in which we were participating. One of the results was W1ESE and the

remainder of the exhibit of which it formed a part, installed for the edification of such of the 300,000 people attending the Exposition as passed by our booth.

#### THE STATION IN DETAIL

W1ESE was of necessity a low-powered affair, since its purpose was not only to supply an exhibit to arouse the interest of passersby and handle messages filed by them, but also to demonstrate to Junior Achievement members and leaders the simplicity and economy with which such apparatus could be effectively constructed. The equipment used was admirably suited for this.

The transmitter was the low-power push-pull set using receiving tubes built by George Grammer, Assistant Technical Editor, and described by him in the November issue of *QST*. Its output was fed into a Zepp antenna 132 feet long, strung between flag poles on diagonal corners of the roof of the building. The height was such that the vertical 45-foot feeders just reached the stand-off insulators on the transmitter to which they were attached.

The receiver was the little two-tube set designed by Ross Hull, altered according to the description which appears in the new 7th edition of the *Handbook*. Type '30 tubes were employed, their power being derived from two dry cells and one standard "B" battery. The ultimate in simplicity, wasn't it?

This receiver, while fully capable of bringing in signals at a comfortable volume when one of the Zepp feeders was switched in for an antenna, was needed for demonstrations, and was replaced in the station by W1LI's receiver, which had two audio stages and used Type '01-A's. Receiving conditions were quite terrible, of course. Our nearest neighbor was a printing establishment running a large job press by an electric motor which played a constant symphony in the 'phones while working. It was so nearly in resonance with the few lone a.c. signals still to be heard that one could almost hear the beat notes!

In addition, there was, of course, a monitor, a frequency meter, and the usual small related apparatus. Ralph Beaudin's single control transmitter (pictured in *QST* for December, 1929) was taken along for demonstration to the class, and also formed part of the exhibit.

That was the equipment used. It was selected with two requirements in mind; simplicity and economy. A glance at the station log and reports received — excerpts from which will follow — show that it possessed still another in good degree; effectiveness. Credit for this may be largely due the staff of operators. There were four of them spending the week in Springfield as guests of Junior Achievement. The chief operator was John R. Blum, W5CKC, of Dansville, N. Y., who is well known as SCM of Western New York.

With him was Howard C. Barton, W8IH, of LeRoy, N. Y. Robert H. Peterson, W1LI, came from Worcester, Mass., for the week, while Phillip C. Gould, W1ALZ, was down from Bangor, Maine.

These men came in response to a hurried call for volunteers sent out just before the event, after we had learned from Mr. Barber that he desired such assistance, and the localities from which he wished it to come. They did splendid work; each of them was a fine operator, and the way they handled W1ESE, the remainder of the exhibit, and the thousand and one other details with which they were confronted, is worthy of commendation and hearty thanks.

The Exposition opened on Sunday, September 14th, at 2:00 p. m. On Saturday Ralph Beaudin and the writer loaded all the components of the station, a lot of *Handbooks* and other League supplies, into the w.k. flivver and set out for the grounds near Springfield, Mass. Clouds hung low and heavy in the sky; rain threatened moment by moment; and after pleading hastily with a watchful traffic cop we parked and unloaded the equipment. That Zepp was put up in record time, with the clouds almost encircling our ears on top of the roof. As soon as it was all up the weather cleared away nicely. . . .

The station was completed that afternoon, but there was time left for no more than two half-hearted and ineffectual calls. On Sunday things opened brightly and continued so. Long before the official opening time the aisles were filled with people, and the amount of interest displayed in the exhibit was intensely gratifying. About the middle of the afternoon W5CKC and W8IH strode in, and were promptly set to work at the operating position. A little later Bob Peterson showed up, and stations were being worked. W1ESE was on the air!

That evening at 10 o'clock the three ops retired to the dormitories provided by Junior Achievement, and proceeded to become children again — for a night! Cast ruthlessly into a wild, howling mass of hundreds of energetic boys between the ages of twelve and twenty, they settled down on their beds amid the demoniac din which reigned only to become targets for apples, tomatoes, numerous other sometime edibles, wet paper balls, soap and all the other playful gestures of friendly American boys, for an endless eight hours. The next night they moved!

Phil Gould might also have been in evidence that first night, but sad to state, calamity befell him, and it was not until the next day that he did stagger in. As has been said, our call to these, and other men was a belated one, and W1ALZ had not received the instructions he required to direct his activities upon arrival. As a result he wandered over the entire 175-acre Exposition grounds vainly searching for us all that night and part of the next day.



## A DISSERTATION ON CRYSTAL CONTROL

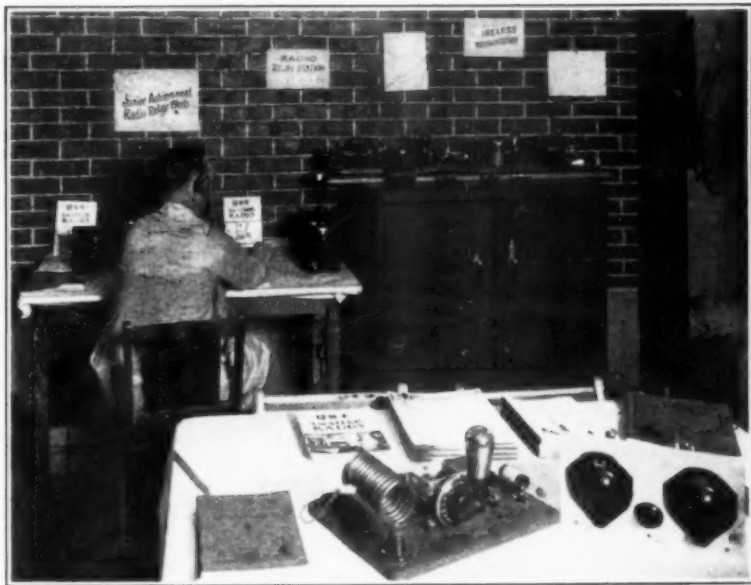
It was this same Gould of W1ALZ who told us of a visit paid the radio shack on one of the Navy destroyers (name withheld by request!) and the ragchew with the op that followed. Gould gazed intently at various parts of the equipment, and then, pointing to the big transmitter, asked, "Do you use a crystal in that?"

The op replied indulgently. "Oh, no, we haven't used crystals for years. You won't find one in a Navy receiver anywhere!"

Gasping, but determined, Phil tried again. "I mean in the transmitter."

Clyde J. Houldson, Technical Information Service, outlined the use, construction, and operation of receivers, taking care also of the many other duties encountered during each day.

On the succeeding days transmitters, elementary theory and operating practice were gone over with the remnant of the class, and some of the preliminary work reviewed for a newly arrived group. The procedure of the organization provided for separate groups of boys and girls to be in attendance each half week, and this rendered the organizing of the course more difficult. All of the fellows reached are going to become splendid amateurs very shortly, though, and will



IN ACTION AT THE OPERATING POSITION

John Blum pounds out one of the numerous "love and kisses" messages. The single-control transmitter and two-tube receiver in the foreground were used in the class instruction.

"Why, no. We use vacuum tubes in the transmitter, too."

Monday was Governor's Day, and during the forenoon the chief executives of many of the Eastern States went past the exhibit. Some of them displayed a real interest in our station, and received a good deal of information. In the afternoon A. A. Hebert, in his capacity as Fieldman, addressed the boys of Junior Achievement on amateur radio in general, and had a most interested audience. After this discussion the selected class received the first code lesson.

E. L. Battey, Assistant Communications Manager, represented Hq. on Tuesday, and outlined all the activities of the amateur to the class, explaining the what, why, and wherefore, as well as giving another code lesson. On Wednesday,

help us immensely. Each of them returned to his club filled with enthusiasm for amateur radio, and it won't be much of a task for them to communicate that enthusiasm to their clubmates and neighbors.

Several New England amateurs stopped by the booth each day, and some very interesting personal contacts resulted. We had the pleasure of meeting W1AJJ on Saturday, a YL well known in New England who recently joined forces with W1AZW in a life QSO. Dozens of old-timers now off the air, stopped by, and so great was their interest in the little transmitter that many of them expressed their intention of getting back on the air soon.

While speaking of the transmitter, we can't

(Continued on page 72)

# Standardization in the Field of Radio Engineering

By Beverly Dudley\*

THE necessity of making, adopting, and using standards may be readily observed in everyday life, for standards and standardized products contribute materially to the wealth, convenience and simplicity of our already complex lives. The statement that a piece of paper is nine inches wide and twelve inches long immediately conveys a definite impression of a particular size of sheet to all those who hear the remark and who are familiar with the English units of measurement. The statement means little or nothing to those who are not acquainted with the English system of measurements, for they have no conception of the standard inch. The definite impression that is conveyed to those familiar with the inch depends entirely upon the fact that the inch is a standard unit of measurement, that the length of the inch does not vary, and that it is universally accepted, at least in English speaking countries.

A standard may be defined as "that which is established by authority, custom, or general consent, as a model or example," and there are a number of different kinds of standards. Standard weights and measures are perhaps the most common although standards may also be originated on nomenclature, uniformity of dimensions, methods of test, test procedure, safety precautions, etc. But whatever the type, in order that it be a true standard, it must be accepted and recognized as such by everyone having occasion to use the particular "standard."

In the field of radio engineering standards are as important — if not more important — as in any other technical or engineering field because of the complexity of the subject. Readers of *QST* who glance over a copy of *Wireless Weekly* or *Experimental Wireless* and the *Wireless Engineer* will immediately notice the unfamiliar terms such as "valve" for vacuum tube, "reaction" for regeneration, and "note magnification" for audio amplification, which are in common use in England. But it is not necessary to go to English publications to find terms that are unfamiliar, or whose meaning is obscure. Such terms as "power detector" and "linear detector," for instance, may have a very definite and limited meaning to a certain group of radio men; it may represent an absurdity to another group. A few terms, such as "microsynchronize" for instance, may mean

nothing at all, except to the originator of the term, and even this is doubtful. To make system out of chaos and to assure that engineers and other technical men engaged in the radio field will all speak the same "shop language," it is necessary to use standard nomenclature and definitions and provide for standard tests and test procedure.

The necessity of standardizing nomenclature was early recognized by the Institute of Radio Engineers and in 1913 their first "Report of the Committee on Standardization" was published. This was followed by subsequent reports issued in 1915, 1922, 1926, and 1929, and at the present time the standardization project is progressing rapidly. Standardization is dynamic — not static — and it is continually necessary to revise and enlarge the scope of standardization reports to include new developments. Several years ago there was no necessity for including in the standardization report such terms as "photo-electric tube," "television," "tetrode," or "megacycle;" to-day these terms are frequently used.

The mechanical structure of the present standardization committees is given in Fig. 1, from which it will be seen that the standardization set-up is a fairly complex but entirely complete system. The structure may be divided into two parts, representing the two types of standards published. The left half of the diagram deals with the standards of the Institute of Radio Engineers; the right half of the diagram deals with "American Standards" as published by the American Standards Association. While this diagram would seem to indicate that there are in reality two radio standards, this is not actually the case; in the final analysis there is only one set of "American Standards," as explained below.

The Committee on Standardization, appointed by the Board of Direction of the Institute of Radio Engineers, has the power to make all Institute standards, subject to the approval of the Board. It is composed of men in all branches of the industry and in various parts of the world who are responsible for the Institute standards. The Committee is headed by Dr. J. H. Dellinger, Chief of the Radio Section of the National Bureau of Standards, who as Chairman of the Committee on Standardization is largely responsible for the work of the widely scattered Committee. The Committee as a whole, consisting of forty-six members in six countries, does not itself originate much of the work; several sub-committees, known

\* Assistant Secretary, Institute of Radio Engineers, 33 West 39th Street, New York, N. Y.



as Technical Committees have been appointed to consider the technical points and to create the standards on four phases of radio communication; receiving, transmitting, vacuum tube, and electro-acoustic devices.

The four Technical Committees are composed of a smaller number of men — usually about a dozen — than the main Committee on Standardization, and in general, the members of the Technical Committees are picked because of their specialized training and experience along definite lines. The Technical Committees gather, originate, determine and prepare the standards in

"The A. S. A. is a federation of forty-three national technical societies, trade associations, and governmental bodies whose chief purpose is to bring together manufacturers, distributors, consumers, technical specialists, and any others directly concerned with a particular standardization project; to assure that a preponderance of these interests wishes to have a national standard; to bring about the organization of a technical committee composed of official delegates of all important bodies interested to formulate the standard; and finally, when such a committee has prepared the standard and given it substantially

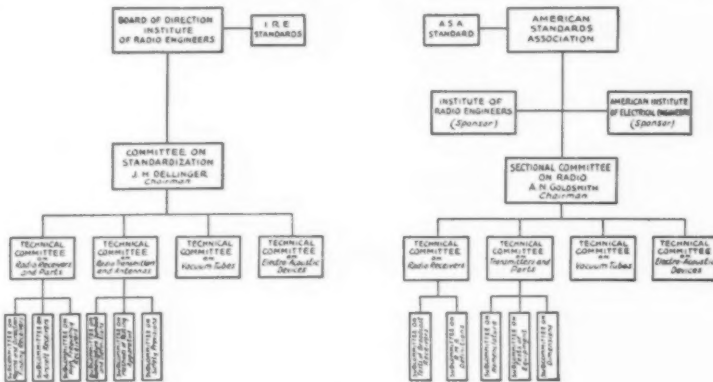


FIG. 1

their respective fields of activity, as well as in any related field of activity that may affect them. There is, naturally, some overlapping of the work of these Technical Committees, and a single subject, such as a vacuum tube oscillator for instance, may be considered and defined by two or more Technical Committees, each from a different point of view. The reports of the four Technical Committees are forwarded upon completion to the Committee on Standardization for rejection, criticism, comment, revision or acceptance. The Committee on Standardization correlates the work of the four Technical Committees, prevents duplication, makes sure that the definitions and standards are uniform and consistent within themselves as well as with those proposed by other Technical Committees, and circulates these tentative standards for comment and criticism. When the Committee on Standardization is assured that its recommendations represent a true consensus of engineering opinion, its report is brought to the Board of Direction for approval and for publication in the I. R. E. Yearbook as the standards of the Institute of Radio Engineers.

On the right half of Fig. 1 is the diagram showing the mechanical structure of the various committees for the generation, preparation and adoption of an "American Standard," under the direction of the American Standards Association.

unanimous approval, and the American Standards Association is definitely assured that the standard represents a real national consensus, to make it an 'American Standard'." A chief function of the American Standards Association is the judicial one of determining whether a national consensus has been reached.

Having determined that national standards on radio communication were desirable, and following requests from a number of radio organizations, the Bureau of Standards organized a conference on January 12, 1923, the result of which was agreed that the American Standards Association form a Sectional Committee on Radio. The Institute of Radio Engineers and the American Institute of Electrical Engineers were appointed by the A. S. A. sponsors for this standardization project in the field of radio engineering. The Sectional Committee is composed of representatives accredited for the purpose by various organized groups concerned with the project. The members of the Sectional Committee on Radio represent the following organizations:

- American Institute of Electrical Engineers.
- American Radio Relay League.
- American Railway Assn. (Telephone and Telegraph Section).
- Bell Telephone System.
- Department of Commerce.

Department of Interior.  
 Institute of Radio Engineers.  
 Inter-Department Radio Advisory Committee  
 (Gov. Depts.).  
 National Assn. of Broadcasters.  
 National Electrical Mfgs. Assn. (Radio  
 Division).  
 National Electric Light Assn.  
 National Fire Protection Assn. and Under-  
 writers' Laboratories.  
 Navy Dept.  
 Radio Corporation of America.  
 Radio Manufacturers' Assn.  
 War Department.

It will be observed that this list includes bodies representative of practically all of the larger organizations likely to be interested in the standardization project on radio engineering.

Sectional Committees are made up of representatives, designated by various bodies concerned with the project assigned to the committee, and of additional specially qualified individuals. The Sectional Committee on Radio is, in general, concerned with the formal adoption of standards on radio matters and it may — and does — assign its work in whole to Technical Committees. It is essential that the completed work of a Sectional Committee shall be considered by all of its members and that their individual decisions shall be recorded and exhibited.

Four Technical Committees of the Sectional Committee on Radio, which correspond in name and function to the Technical Committees of the I. R. E. Committee on Standardization have been appointed to originate, gather, and prepare standards. The Sectional Committee on Radio is concerned with guiding and directing the work, and to a greater extent, of approving or rejecting the recommendations of the Technical Committees. The work of preparing the standards is carried on freely and simultaneously by the Technical Committees (and all other interested bodies) in order that the differing viewpoints of the several groups may be fully utilized and the most broadly suitable standards produced.

Although the diagram shows two distinct sets of standardization committees and two sets of standards — the I. R. E. and the A. S. A. — it should not be assumed that there are actually two independent and unrelated standardization reports. The I. R. E. standardization report relates specifically to the engineering side of radio communication, and consequently is generally technical and somewhat limited in scope. The standards accepted by the A. S. A. must be acceptable to the representatives of the organizations as a whole, and the A. S. A. standard must represent a consensus of opinion of the greater portion of those actively engaged in the radio field before it may become an American Standard. But insofar as the standards relate to radio engineering, the A. S. A. standards are essentially the same as the

I. R. E. standards and the A. S. A. looks to the Institute of Radio Engineers and the American Institute of Electrical Engineers, as sponsors of the radio standardization project, to vouch for the technical qualifications of the proposed standards. The A. S. A. standard is the final authority on commercial and engineering standards in this country (but should not be confused with the National Bureau of Standards which is the final authority on legal standards in the United States) and because its standards represent the consensus of a larger and more general group than the I. R. E. standards, there is more time required for an A. S. A. standard to be adopted and published than for an I. R. E. standard. The formulation, acceptance, and publication of the final standards applying to radio engineering are, therefore, seen to be somewhat long and drawn-out processes. While at first this might seem to be a decided disadvantage, in reality it is a most important advantage. Standardization *can* be carried out too quickly or too prematurely, and if this is done, more harm than good is done, for faith is lost in the standardization project.

And now that we have given an outline of the general method of formulating and adopting standards for radio engineering, let us inquire more into their use. The importance of standards is not fully appreciated by those having little occasion to refer to them, and for this reason, their importance is likely to be belittled by the vast majority who need them most. The reports of the Committee on Standardization of the Institute of Radio Engineers are available without cost to its members, and at a nominal cost to non-members. This report, issued every few years, is widely used by radio and communication engineers. It may have little direct importance to the amateur who is interested only in the proper design and operation of his station, but it does affect his station and operation, indirectly at least, for the technical articles appearing in *QST* frequently use these reports for obtaining exact wording and specifications for test methods. A practical example of this occurs in connection with "The Modulometer" in the August, 1929, issue of *QST* where the I. R. E. definition for modulation factor is employed. Frequent reference is made to the I. R. E. report even though no footnote calls attention to the source of information.

But in another way the amateur affects these standardization reports and is in turn affected by them, for the American Radio Relay League is represented in a number of subcommittees, Technical Committees, as well as in the Committee on Standardization and the Sectional Committee on Radio. The connection between the League and the Institute on the various committees pertaining to standardization is mutually beneficial, even though the direct and indirect effects may not be readily apparent to the general membership of the two organizations.

# The Doublet Antenna

## A Hertz Antenna With Two-Wire Matched Impedance Feed

By Clyde J. Houldson, W1KP\*

JUDGING by the number of letters that come to the Technical Information Service desk, many amateurs are experiencing difficulty in coupling the push-pull transmitters — which have been described from time to time in *QST* — to the Hertz antennas that are generally used and really load each tube equally, which is the ideal condition when using tubes connected in push-pull. About the only suitable type of coupling that has appeared is the one which employs the "split" antenna coupling coil, as shown in the article "Advanced Transmitter Design" in June, 1930, *QST*. The single-wire fed type of antenna described by WSGZ in September, 1929, *QST* was an ideal one for use with a single tube in the output stage, but difficulty is experienced in coupling a push-pull transmitter to a single wire feeder.

The antenna system to be described uses a two-wire matched impedance feeder system which

the plate tank inductance to secure the right load conditions.

### HOW IT WORKS

The antenna proper is our old friend the Hertz. It is fed by a two-wire transmission line of any desired length and which is untuned. There are no standing waves; consequently there is practically no radiation or leakage from the feeders.

The feeders do not connect exactly at the current loop (center of antenna) but are tapped on slightly off the point where the current is a maximum. The purpose is to make the impedance across the output of the feeder system match the impedance of the transmission line, thereby securing maximum power transfer and at the same time eliminating radiation by the feeder system.

The adjustment of a transmission coupling to the antenna requires an understanding of simple single-phase transmission line phenomena.<sup>1</sup> Any transmission line has a characteristic surge impedance which depends upon the size and spacing of the conductors composing it, and also upon the impedance of the terminating network. When the proper adjustment of the line is secured (at radio frequencies) it will act as a pure resistance connected across the output of the last stage of the transmitter.

As a rule the transmission lines used for radio frequencies have a characteristic impedance of 500 to 800 ohms. Generally, however, a 600-ohm line is most used, especially in commercial work.

For amateurs who wish to calculate the impedance of the transmission line in use, the following formula can be used and will give quite accurate results for an outdoor open transmission line:<sup>2</sup>

$$Z_0 = 276 \log_{10} \frac{2D}{d}$$

Where  $Z_0$  is the characteristic surge impedance of the line in ohms;  $D$  is the distance between the center of the two conductors composing the transmission line; and  $d$  is the diameter of the conductors.

In using this formula distance between conductors and wire diameter must be in the same units (i.e., in inches or milliameters, etc.).

<sup>1</sup> "Some Transmission Line Fundamentals," by G. A. Boddie, *Electrical Journal* for Jan. and Feb., 1928.

<sup>2</sup> "Electric Oscillations and Electric Waves," by G. W. Pierce, "Matching the Transmission Line to the Antenna," *QST*, Jan., 1928.

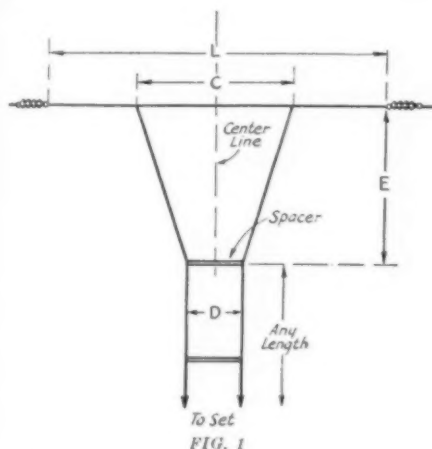


FIG. 1

is quite suitable for use with push-pull transmitters, and is known as the "doublet" antenna system.

Success of this antenna system depends entirely on three important dimensions (referring to Fig. 1) namely the value  $C$  or coupling,  $E$  known as feeder clearance, and  $L$ , the length of the antenna. All three of these must be correct for the particular operating frequency and the only adjustment remaining is varying the taps on

\* Technical Information Service, A. R. R. L.

It can be said generally that the proper termination of a transmission line is one of the most important adjustments of the entire transmitting system, and will have a great influence on the efficiency of the station, affecting both the range and the quality of the signals.

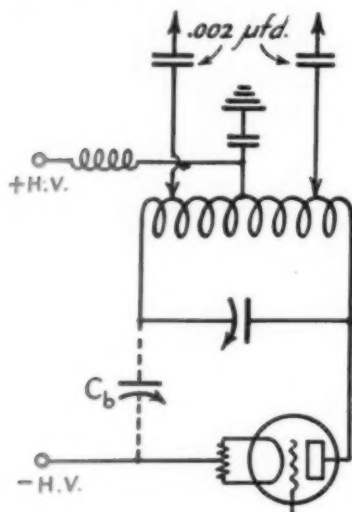


FIG. 2

The greatest transfer of energy from the plate tank coil to the antenna is obtained when the termination impedance just equals or matches the characteristic impedance of the transmission line. If we assume the line having a characteristic impedance of 600 ohms, then to obtain the maximum transfer of energy, the impedance of  $C$  must also be 600 ohms.

When the system is correctly balanced, each conductor composing the transmission line is at equal but opposite potential to the other and any radiation from the line is thoroughly neutralized. When the transmission line is not balanced, radiation from the feeders is very likely to occur but out of phase with the antenna radiation and likely to affect the total radiation seriously. Also, if the phase balancing and impedance matching are not obtained, all of the power which is delivered the transmission line will not be passed on to its ultimate load, the Hertz radiator. The power which the radiator does not take will surge back and forth from end to end of the transmission line (reflections) until the energy is finally dissipated in radiation and by the resistance of the transmission line itself. However, when the impedance of  $C$  equals the impedance of the transmission line, a matched condition exists and practically all the power delivered to the line from the output stage will be delivered to the antenna, the only loss being the  $I^2R$  loss in the transmission line conductors. This loss is really negligible.

By following the formulas very closely, the correct values can be obtained and perfect matching of impedances can be very nearly approached, leaving only the adjustment of the antenna coupling clips on the plate tank coil to complete the matching process.

The antenna coupling clips are connected an equal number of turns either side of the center of the plate tank inductance. To load the set the clips are moved along the coil (from center) until the tubes draw the normal plate current recommended by the manufacturers.

#### CONSTRUCTION AND OPERATION

After deciding on the frequency at which the system is to operate, the length of the antenna is determined. In order to secure maximum power output for a desired frequency the formula below can be used.

$$L \text{ (feet)} = \frac{492,000}{F} \times K \text{ or}$$

$$L \text{ (meters)} = \frac{150,000}{F} \times K$$

Where  $L$  (Fig. 1) is the antenna length in feet or meters for a desired frequency  $F$ , and  $K$  is a constant depending on the frequency band.

For frequencies below 3000 kc.,  $K$  is 0.96

" " between 3000 and 28,000 kc.,  $K$  is 0.95

" " above 28,000 kc.,  $K$  is 0.94

$F$  is the frequency in kilocycles.

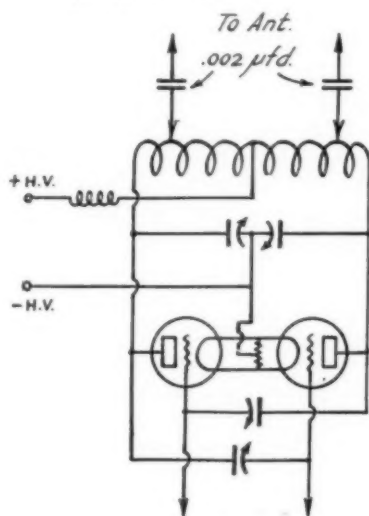


FIG. 3

The coupling or value  $C$  (Fig. 1) must also be determined:

$$C_{\text{feet}} = \frac{492,000}{F} \times K_1 \text{ or}$$

$$C_{\text{meters}} = \frac{150,000}{F} \times K_1$$

$K_1$  has different values for the various frequency bands.

$K_1$  is 0.25 for frequencies below 3000 kc.

$K_1$  is 0.24 " " between 3000 and 28,000 kc.

$K_1$  is 0.23 " " above 28,000 kc.

$F$  is the fundamental frequency in kc.

The other remaining value is the feeder clearance  $E$  (Fig. 1), and it is important that this clearance be maintained when constructing an antenna of this type.

$$E_{\text{feet}} = \frac{492,000}{F} \times K_2 \text{ or}$$

$$E_{\text{meters}} = \frac{150,000}{F} \times K_2$$

$K_2$  is 0.30 for all bands and  $F$  is the frequency in kilocycles.

The above equations, as stated before, are for feeders having a characteristic (surge) impedance of 600 ohms and will not apply to feeders of any other impedance. An impedance of 600 ohms is standard in commercial work and is convenient

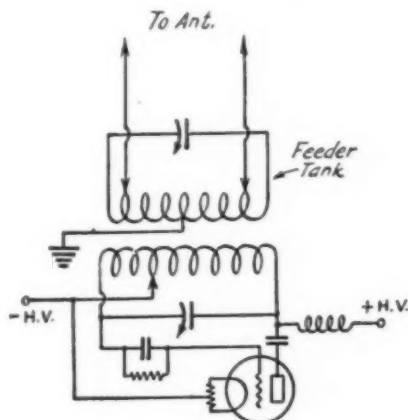


FIG. 4

and quite satisfactory for amateur use. The proper spacing of the wires composing the feeder system for a 600-ohm transmission line can be computed to a very close approximation by this formula:

$$D = 98 \times d.$$

Where  $D$  is the distance between the centers of the wires composing the feeder system and  $d$  is the diameter of the wire. If the diameter of the wire is in inches the spacing of the wires will be in inches, and if the wire diameter is in millimeters the spacing will be in millimeters.

For the convenience of both U. S. and foreign readers, the diameters of the various sizes of wire most used will be found as follows:

B. & S. Gauge	Diameter in inches	Diameter in millimeters	Nearest Equivalent British S.W.G.
No. 10	0.1019	2.59	No. 12
" 12	0.080	2.05	No. 14
" 14	0.064	1.63	No. 16

The wires composing the feeder system can be any convenient length that suits the particular location, successful operation with feeders 1200 feet long being quite common. Since the majority of amateurs reside in cities, where space for an

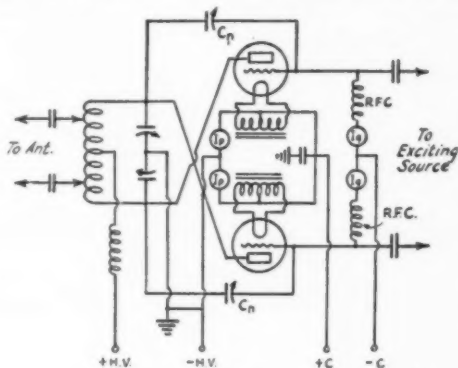


FIG. 5

antenna is usually at a premium, it is not expected that many amateurs will have to exceed this length.

The formulas are practically self-explanatory — but probably one example would help. Suppose the antenna's fundamental frequency is to be 3500 kc.

First it would be necessary to solve for the antenna length.

Substituting the proper values in the formula,

$$L_{\text{feet}} = \frac{492,000}{3500} \times .95$$

$$= 133.54 \text{ ft.}$$

Next we would need to solve for the coupling  $C$  for 3500 kc.,

$$C_{\text{feet}} = \frac{492,000}{8500} \times .24$$

$$= 33.73 \text{ ft.}$$

Next would be the feeder clearance:

$$E_{\text{feet}} = \frac{492,000}{3500} \times .30$$

$$= 42.17 \text{ ft.}$$

In this example, we will use No. 12 B & S enameled wire, which has a diameter of 0.080 inches. Therefore the spacing of feeders should be

$$98 \times 0.080 = 7.84 \text{ inches}$$

Therefore you have the complete data for an antenna suitable for operating on 3500 kc. Re-



ferring to Fig. 1, the length  $L$  should be 133.54 feet; the coupling value  $C$  should be 33.73 feet or 16.86 feet each side of the center-line of the antenna; and the feeder clearance should be 42.17 feet. The spacing  $D$  between feeder wires is 7.84 inches. No. 12 B. & S. wire also may be used for the antenna. Well soldered connections should be made where the feeders join the antenna, of course.

It is important that you follow the four dimensions very closely. Otherwise the system will not operate as a doublet antenna — or even may fail to operate entirely.

The spacers used for the feeders may be either glass or well seasoned wood boiled in paraffin.



WRONG METHOD  
FIG. 6

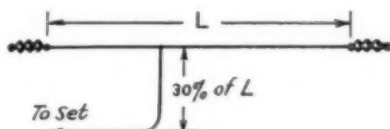
The main requirement is that the feeders be accurately spaced throughout their entire length. If any turns or bends have to be introduced into the feeder system before it reaches the transmitter it is essential that the feeder system be rigidly supported and that the bends be gradual and not sharp right-angles.

This is just the type of antenna that many amateurs have been looking for, especially those using the push-pull type transmitter. In this case, the tubes must be loaded equally for best results. Several diagrams are given in Fig. 1 showing the general arrangement, while Fig. 2 shows circuits using a single tube in the output stage. The condenser  $C_b$  connected from the "free" end of the tank circuit to the filament circuit may be necessary where the circuit plate-filament capacity is greater than a few  $\mu\text{fd.}$  and should be of a value equal to the tube plate-filament capacity. Its purpose is to make the tank circuit electrically symmetrical about the center by balancing the plate-filament capacity which is in parallel with the other side of the tank inductance. This capacity is hardly necessary with a Type '52 tube (which has a negligible plate-filament capacity) but should be used with tubes having appreciable circuit plate-filament capacity — including socket and wiring capacity. A capacity of about 10  $\mu\text{fd.}$  or so will usually suffice.

Fig. 3 shows the connections when using two tubes in push-pull as the final stage. In both cases the positive high voltage is fed in at the center of the plate tank inductance and the usual r.f. by-pass condenser is connected there. This places the center of the tank coil at ground poten-

tial with respect to the r.f., both ends of the coil being "hot."

In all diagrams the antenna blocking condensers have a capacity of 2000  $\mu\text{fd.}$  These fixed condensers should have a voltage rating which is somewhat higher than the plate voltage used on the output stage. This is advised for several reasons. As a rule the negative high voltage is grounded; therefore, if the transmission line should become grounded or the insulation of the antenna system fail, condensers having a low voltage rating would invariably blow and thus short the d.c. power supply. The use of the condenser is not only a safeguard to the station equipment but also to life, because if the condensers were omitted, any-



CORRECT METHOD  
FIG. 7

one coming in contact with the transmission line or antenna would probably receive the plate voltage used on the last stage, through his body to ground. On high power installations this might result in very severe shock or even death. By using the condensers, r.f. only exists on the transmission line while the transmitter is operating. This is not as dangerous as the high-voltage direct current used at some stations. The use of the coupling condensers is especially recommended to amateurs who live in apartment buildings, where the transmission line as a rule must take a long circuitous path to reach the roof where the antenna is located.

Fig. 4 illustrates the method of connecting this type of feeder to the output of a transmitter when it is impossible to arrange the plate tank circuit to give the required balance. The feeder tank circuit will be similar in construction to the usual transmitter tank circuit. As with the other arrangements, the clips are adjusted symmetrically on either side of the inductance center until the maximum power is being transmitted to the antenna. This will occur, of course, when the impedance across the feeder input is equal to the surge impedance of the transmission line.

As stated before, best results will be obtained when each tube draws an equal value of plate current. This condition is desired particularly when operating two tubes connected in push-pull in a radiophone transmitter. The arrangement shown in Fig. 5 will easily accomplish this. An extra filament transformer (or winding) will be necessary. A milliammeter to measure the plate current of each tube can be used or a jack can be



placed in each negative return circuit so that the current of either tube can be read merely by inserting the milliammeter plug into either jack. This will require only one plate current milliammeter. The use of two meters is of course the ideal method; but the plug and jack method can be used to accomplish the same thing (i.e.) balance the plate current drawn by each tube. Grid current meters also may be connected in the grid circuit as shown in Fig. 5. This helps a great deal in the adjustment of the grid excitation clips which connect to the tank coil of the preceding stage. The excitation can be adjusted until the grid current for each tube is identical.

When the grid current has been balanced, the



WRONG METHOD  
FIG. 8

plate voltage can be applied to the last stage. Then the antenna coupling clips are adjusted until an equal value of current is flowing in each plate circuit, indicating that the load is balanced and that each tube is carrying its share of the load.

For an arrangement of this sort, it is essential to use "matched" tubes or tubes which possess identical characteristics. If this is not done, trouble will be experienced in balancing the plate input to each tube, even though the grid excitation of each is the same. This arrangement is usually termed a "balanced push-pull amplifier" and is especially recommended for use in the Class B linear amplifier stage of a 'phone transmitter. It is also quite suitable to use in the final stage of the better class of code transmitter.

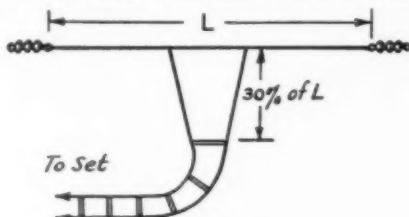
#### A FEW PRECAUTIONS

Certain factors must be kept in mind when designing a Zeppelin or single-wire fed Hertz and the same holds true for the doublet antenna. These important factors have been pointed out in the discussion and it is urged that they be adhered to or else the system will not operate on the desired frequency or fail to operate entirely.

As shown in Fig. 6 the feeder system should never follow the antenna back to the point where it enters the "shack." It can be safely said that nine out of ten of the amateurs experiencing difficulty with the single-wire fed Hertz and writing into the Technical Information Service were using the general arrangement shown in Fig. 6. This is not recommended under any circumstance. The

feeder should run straight away from the antenna for at least 30 percent of one-half wavelength as shown in Fig. 7. From there the feeder can continue in any direction to the shack and transmitter. The same applies to the doublet antenna, and the arrangement shown in Fig. 8 is *not* recommended. It is very important that the feeders run the required distance as shown in Fig. 9. This is to prevent interference of the feeder with the radiation of the antenna, and vice versa.

Many amateurs who live in cities are constantly writing in saying that they are pressed for room to erect a half-wave Hertz antenna for operating on 3500 kc., and that they desire to use a bent type of antenna. This is all well and



CORRECT METHOD  
FIG. 9

good as many city apartment dwellers use the bent type and secure very good results. However, if you find it necessary to employ the bent type at your location because of lack of room, remember it is always best to steer clear of sharp angular bends in the antenna. If bends are absolutely necessary make them well rounded ones. However, the best results will be obtained if the horizontal part of the antenna is one straight run. The bent type should be used only where the space available does not permit the straight-run type.

Although this type of antenna system may be operated at harmonics of its fundamental frequency with some degree of success, its characteristics are more particularly suited to operation at its fundamental frequency only.

When designing a system of this type it is urged that one of the wire sizes that is shown be used. Also use the spacing of feeders, coupling, feeder clearance, etc., that are correct for the desired operating frequency.

This type of antenna has been used by a number of amateur stations and also is used with success in several commercial high-frequency communication systems.

## Strays

W9DOS sends us one of those "Believe it or not" cartoons showing a century plant which grew 30 feet in ten weeks out in San Diego. He wants to know where to obtain seeds for such a plant. So do we. Any of you Californians have any dope on this? We want to raise some masts.

# Who's Who in AMATEUR WIRELESS



ALLEN H. BABCOCK



LOUIS R. HUBER

The old familiar heading reappears after many years. While not planned as a monthly department, from time to time *QST* will present brief sketches of some of those amongst us whose activity in amateur radio has made them of general interest to our readers. We have pleasure in presenting this month two members of the Board of Directors of the A.R.R.L., and it just happens that they are the oldest and the youngest members of that body. Permit us:

Allen H. Babcock, Consulting Electrical Engineer of the Southern Pacific Company with offices in San Francisco, is the Director of the Pacific Division of the A.R.R.L. He was first elected to the League's Board in 1923 and has been constantly returned to that body by his members ever since. He lives in Berkeley, across the Bay from San Francisco, where he owns and operates W6ZD.

Mr. Babcock was born at Buffalo, N. Y., August 12, 1865. His education was received in the public schools of Oakland, Calif., at Phillips Exeter Academy, the University of California and Lehigh University. He has had a long career in electrical engineering, commencing in 1891 with the Thompson-Houston Electric Co. at San

(Concluded on page 78)

Louis R. Huber, retiring director of the League's Midwest Division, was born at Tipton, Iowa, on January 10, 1908, and his age is therefore exactly that of the average of League membership.

His start in radio came at the age of eight, gathering bits of wire, *à la* Skeezix, while the telephone men were at lunch. The inevitable half-inch spark coil was acquired at the age of ten, fond parents giving the use of the barn for station purposes if Marconi would promise not to bore too many holes in the wall. The invitation was accepted, the promise as inevitably broken. Three years later the government licenses were secured and 9DOA was on the air with a  $\frac{1}{2}$  k.w. Packard and rotary, only to be displaced in 1922

(Concluded on page 82)

## A New Type of Crystal Holder

By C. W. Klenk, W9AAU-W9ZK\*

SOMETIME ago, when it was decided to adopt crystal control on the transmitter at W9ZK, difficulty was experienced in finding a suitable device to hold the crystal properly and at the same time to allow changing the crystals by the "plug-in" method. Nothing on the market was found to be quite satisfactory. Therefore it was necessary to devise a holder that would meet the conditions. With the aid of my dad, Dr. C. L. Klenk of W9AAU-W9ZK, a device was evolved which was in every way satisfactory. Because it worked out so well the writer desires to pass the idea on to the amateur radio fraternity.

The holder, plugged into the mounting, is shown in a photograph. As the mounting base

The holder comprises a bakelite base, an inverted "U" bracket, two pieces of felt, two ground brass plates, a thumb screw and lock nut for adjustment, a piece of bakelite tubing, a bakelite cover, and two G. R. plugs. The base is machined in a lathe from half-inch sheet bakelite, rounded



THE CRYSTAL HOLDER AND MOUNTING BASE

was made to conform to certain specifications peculiar to the equipment at W9ZK, the writer will not waste space or time describing it. The pictures give an idea of its appearance anyway.

This mounting is ideal in that it is possible to secure a micrometer adjustment of tension on the crystal. Also it is possible to adjust to allow an air space between the upper plate and the crystal which is ideal for shifting the frequency a slight amount.<sup>1</sup> The crystal is protected from dust and dirt and remains permanently adjusted. The holder is rugged enough to allow dropping, but since the crystal is quite fragile it is not advisable to make a habit of this.

One photograph shows the holder with its parts disassembled. In Fig. 1 is a detailed assembly drawing showing a plan view and a cross section of the elevation as well as the complete specifications.

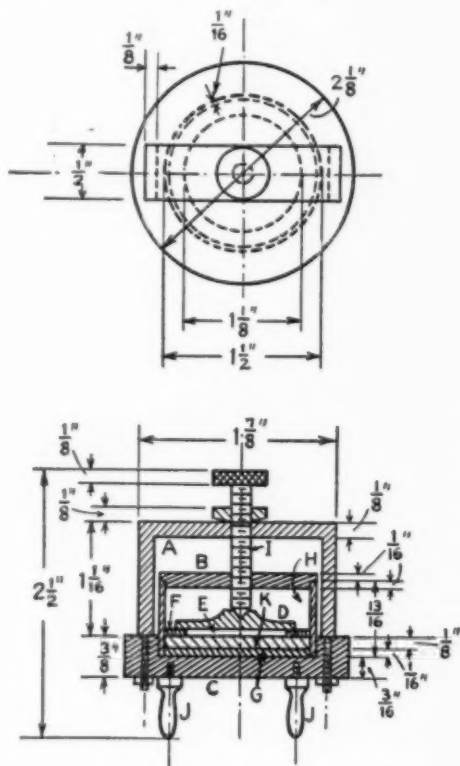


FIG. 1.—DETAILS OF THE CRYSTAL HOLDER

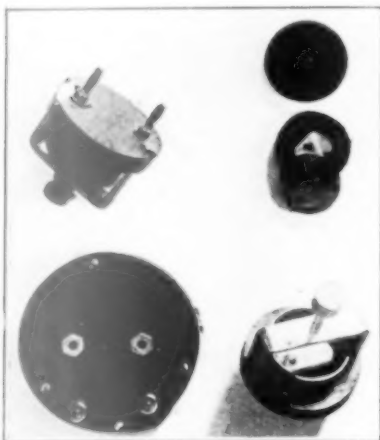
Material used: A, brass; B and C, bakelite; D, brass; E, quartz crystal; F and G, felt; H, bakelite tube; I, brass machine screw, 12-48 thread; J, General Radio plugs; K, brass.

and hollowed out to take the end of the short piece of tubing. This tubing is cemented in place. Into the bottom of this cup is placed a piece of good quality felt cut to conform to the inside diameter of the tubing. Over this felt is placed a disc of brass of the same diameter, which has been turned out and cut to size, the top surface having been ground flat and smooth. On this brass plate is placed another piece of felt of the same size and quality only it has a hole cut

\*3148 Halliday Ave., St. Louis, Mo.

<sup>1</sup>For details of this feature see "QSY With Crystal Control," QST, September, 1930.

in the center to provide space for the quartz crystal. The hole should be cut slightly larger than the actual dimensions of the crystal to allow for sideward expansion of the felt when it is subject to the compressive force of the thumbscrew. Over the crystal and part of the felt is placed the top plate, made of brass with the under surface ground perfectly smooth. The top



THE MOUNTING BASE AND BOTH ASSEMBLED AND UNASSEMBLED CRYSTAL HOLDERS OF THE TYPE DESCRIBED

of the plate tapers from the edges to the center and in the center a recess is made to take the tip of the thumbscrew. The bakelite cover (with a hole cut through the center to allow passage of screw shank) is then placed snugly on the top of the bakelite tube. The inverted "U" bracket is fastened to the base of the holder. The screw is placed through the threaded portion of the bracket and turned down until it engages with the recess in the top of the upper plate. Following this the screw is tightened until the crystal is properly held in place. The lock nut prevents the thumbscrew from loosening and allowing the crystal to get out of adjustment.

The two G. R. plugs are fastened under the bakelite base. One is connected directly to the brass bracket which makes a connection to the upper plate. The other is connected through the base by a flexible lead to the lower plate.

The piece of felt surrounding the quartz plate regulates the amount of tension. Turning down the thumbscrew compresses the felt and brings the upper plate nearer to the crystal. Turning the screw in the opposite direction releases the tension on the felt and it expands, pushing the upper plate away from the crystal. By this method the desirable air space between the crystal and the upper plate can be obtained with very close precision. The felt placed under the lower plate acts as a cushion for the whole as-

sembly and also tends to keep the surfaces of the two plates parallel to each other. Any small inaccuracies as the result of grinding are compensated by this means.

In building this type of holder extreme care must be taken in getting parallel surfaces on the upper and lower plates. Accurate machining and then careful grinding are absolutely essential in securing the desired results. The two plates may be ground by hand, rubbing them together and using fine valve grinding compound as a grinding medium. After the grinding is completed the plates are polished with jeweler's rouge. Then each part of the holder must be cleaned thoroughly to remove all traces of grease and moisture, especially from the surfaces of the ground plates. It is advisable also to clean the felt pads thoroughly. A very convenient cleaner is carbon tetrachloride, commercially known as "Carbona." It is a non-combustible, quick drying liquid which can be obtained in nearly all drug stores for about forty cents a pint.

This type of holder has only one drawback; it does not readily lend itself for use in a thermostatic oven which is used to keep the crystal at a constant temperature. Unless the frequency is close to a band limit, however, fifteen to twenty degrees variation in temperature does not cause a serious change in the frequency at which the crystal vibrates, at least as measured by the change in dial setting on the average short-wave receiver.<sup>3</sup> The advantages of this mounting are so numerous as to overcome this one small drawback. However, we are working on a crystal holder for use in a constant temperature oven and as soon as we have successfully completed it we shall present a description of it to the amateur fraternity.

<sup>3</sup> With a 3500-ke. crystal the change in frequency may be as much as 1 kc. for a 15° C. rise in temperature. The heating is reduced when the oscillator is operated at a plate voltage of less than 250 volts and no more than sufficient excitation. See "Crystallizing Crystal Grinding," QST, April, 1930, for further information. — EDITOR.

## Changes in Regulations

THE Federal Radio Commission on September 22d last made two amendments in its General Order No. 84 which contains the regulations for amateur stations, as published in QST for May 1930, page 16.

The first of these is of no importance, being the transposition of paragraphs (f) and (g) of Section I.

The other change eliminates the text of Section IX, providing for the routing administration of amateur stations by the Radio Division of the Department of Commerce, acting in the name of the Commission. It substitutes the following new text: "These regulations shall be administered in

(Continued on page 84)

## The Story of W1MK

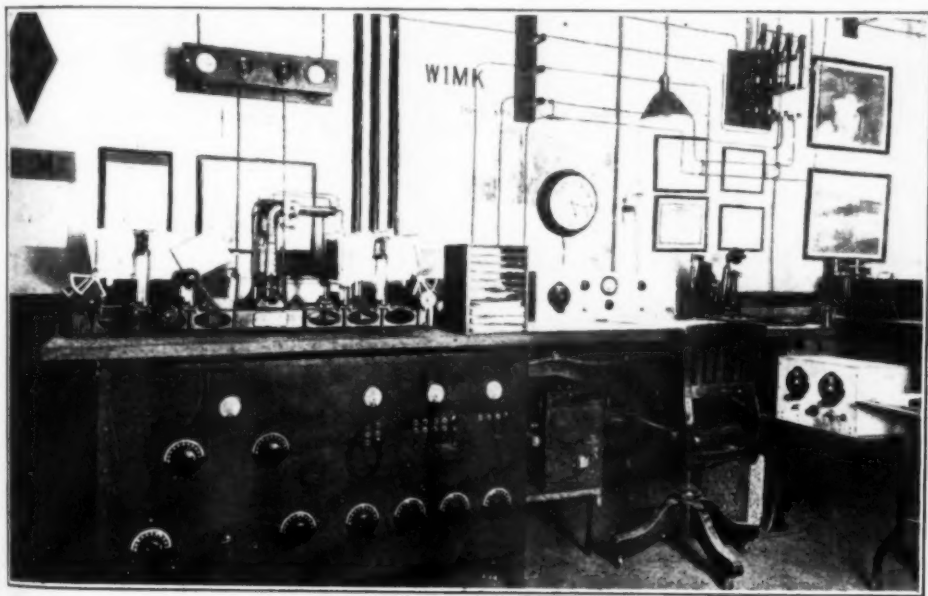
By F. E. Handy, A.R.R.L. Communications Manager

*This article is too long. Had we printed it as originally written, the story would have filled twenty pages instead of twelve. What we must realize is that the present W1MK represents the culmination of a relatively tremendous amount of development work. In the last six years or so W1MK has pounded out millions of words to amateurs the world over; but simultaneous with that activity there has been continuous experiment, frequent modification and steady technical progress. Because W1MK is probably the best-known amateur station in the world and because it has never been the subject of a descriptive article in QST, we believe the present story to be completely justified.—EDITOR.*

THE present W1MK is relatively well known to League members everywhere in view of its regular operation and prominent part in different A.R.R.L. activities. This was not so with the modest station to represent Headquarters which went on the air about six or seven years ago for the first time. At that time the League was located in the downtown business section of Hartford at 1045 Main Street and this early station was situated in the old Traffic Department office.

The first set-up, while an example of satisfac-

tory design for the day and time, would fail to meet a number of the present-day requirements. Four UV-202 tubes were paralleled in a Hartley rig. An edgewise-wound coil of copper strip ten or more inches in diameter was used. With the tuning condenser practically "out" the set got down to about 77 meters. An m.g. power supply and an antenna well in the clear were the bright spots in this arrangement. Of course the frequency stability was nothing like what we can get in modern transmitters but it sufficed for pre-historic times — or at least no criticism was offered. This outfit



A.R.R.L. HEADQUARTERS STATION W1MK

The receiver and an accurate synchronous electric clock are directly in front of the operating position. The key and all control switches necessary for full operation of the station are just at the right, together with the telephone and the listening monitor. Messages are filed in the box at the left so that they may be located without interrupting the keying. The two transmitters shown at the left may be keyed simultaneously in sending information addressed to all League members, or they can be worked separately. The t.p.f.g. transmitter on top of the table normally works on 5575 kc., although interchangeable coils are provided for operation in other bands. The large bakelite panel which shows up prominently in the foreground is the new oscillator-amplifier transmitter usually operated crystal-controlled and capable of 500 watts output with a high degree of frequency stability. This transmitter is used for 7000 and 14,000-ke. work.

The temperature control box for the crystal is located on a shelf below the table just to the right of the new transmitter. The General Radio precision frequency-meter is at the extreme right.



was operated by volunteer staff-member operators during the noon hour each day.

The reason for the establishment of this station was the growing need for collecting Hartford-bound radiograms which must otherwise be mailed in from outside points. At that time 3500 kc. was comparatively new territory so there was ample daylight operation on this frequency. No one at Headquarters was much interested in the DX possibilities of this makeshift equipment so there was practically no operation outside the noon-hour period. Nevertheless, this low-power



77-meter station got across to a fellow ham in the Netherlands for at least one satisfactory contact before the set was dismantled — not a bad record for the power and frequency used, even today. (The experience is well-remembered by the writer since it was necessary to show the Dutch QSL to some of the skeptics about the office.)

When Headquarters moved into larger offices at 1711 Park Street in April of 1925 the little set went along too. However, it was soon to be supplanted by a more powerful outfit using two fifty-watt tubes. This in turn was replaced by a single 250-watt tube with self-rectified power supply. These transmitters were allotted space in the Circulation Department. The location was such that visitors and clerks often yielded to the temptation of twisting dials, thus throwing the outfit out of adjustment — or worse, off frequency, although this did no damage since the antenna was invariably off-tune. The transmitter received unintentional jolts and jars from the nearby addressing machinery and from handling of heavy bundles of *QST*'s and often went haywire because of experimentation. The operating desk was in a conference room somewhat removed from the transmitter. When the keying relay would stick, the unlucky operator might frequently have been seen dashing wildly across the corridor, slamming doors and getting at the set in the Circulation Department to correct the difficulty.

Several volunteer operators, each keeping once-a-week "tricks," kept this station on the air for a considerable time. Evening schedules were attempted in addition to the noon-day shifts. To

assist neighboring broadcast listeners who had the infamous single-circuit receivers two score or more wavetraps were distributed with effective results and a fixed coöperative policy was established. The location was nevertheless impractical for satisfactory communication work. Interference from buzzers, dial telephones, dictaphone motors, street cars, a theater sign flasher, battery charging station, some beauty-parlor violet-ray generating equipment, and other equally incurable interference sources made operating unpopular and sometimes well-nigh impossible. It was hard for amateurs in radio contact with Headquarters to believe the interference was as bad as indicated by the operator, but listening in to-day will still show a remarkably high noise level.

The Board of Directors reviewed the whole matter of Headquarters' Station operation at its 1927 annual meeting, considering the existing makeshift equipment, the unsatisfactory location and determining the policy to be followed. The Communications Manager was ordered to proceed with the installation of a powerful station in a suitable location where it might be operated effectively and be of genuine service to the amateur fraternity as well as a credit to Headquarters. It is a result of this Board order that we have the fine equipment and installation that has become so well known since it was placed in operation in February, 1928.



Several possible locations were examined and rejected before a location at Brainard Field, Hartford's airport and one of New England's best flying fields, was chosen. The existing apparatus was taken down and the inferior parts discarded. Wherever possible, parts were set aside to be built into the new station. The best quality procurable in all kinds of equipment was desired but the size of the installation job made economy an important consideration. A good friend of amateur radio who had long desired to see a top-notch station on the air at Headquarters donated a substantial part of the power supply equipment, the three-unit Esco motor-generator that has given such a good account of itself. This machine consists of a two-h.p., two-phase, 220-



volt motor, a 2000-volt 750-milliamperere generator, and a 15-volt exciter which furnishes both field current for the generator and filament current for several Type '04-A tubes.

A three-section telescoping wood mast with a ladder-like main section to facilitate climbing was put up to support the far ends of the antennas. The height of the mast was made the maximum permitted by the "gliding angle" which must be maintained to permit landings without danger at every flying field. Two horizontal Hertz-type antennas were erected, both well in the clear, one supported at the near end on a brick chimney and the other supported at the near end on a short mast on the Communications Section building. One antenna is a half-wave 3575-kc. affair, the other a full-wave 7150-kc. antenna. These frequencies were chosen in harmonic relation, the 3575-kc. frequency as a "marker" or beacon to assist radiophone amateurs in complying with the regulations and locating their transmissions in the assigned 3500-3550-kc. 'phone band. Two-wire voltage (Zepp) feed is used to both antennas, the feeders in each case being a single quarter wave-length in length. A separate receiving antenna is provided to facilitate break-in when conditions permit and to eliminate the necessity for changing antennas on the receiver.

#### POWER SUPPLIES

Within certain limits radio equipment can be accommodated to different building arrangements. Once a satisfactory location is found where there is room for antennas to be erected in the open and the noise level is low enough to make good reception possible, a study of the physical arrangement is necessary. One should separate the transmitters and power supply equipment from the receiving and operating location as much as practicable. Remote control would be ideal where break-in operation is desired but since the best of apparatus sometimes breaks down the transmitters and power supplies must be within a moderate distance. In our particular station space considerations have almost dictated the placement of apparatus.

Two rooms were available for all equipment. Only one had enough light and offered enough space for the operating position, so from the first it was evident that generators, batteries, relays and all messy or noisy power supply or auxiliary equipment should be relegated to the smaller back room. This room was not large enough to take care of the transmitters, as was desired, to get them away from the receiving tuner; in addition the proposed equipment for our 1928 station

had to be accessible so that the frequency of one or both transmitters might be changed at will, both from band to band and slightly to avoid interference. Thus our transmitters were placed on the bench with the receiver, though with some trepidation in view of the power involved.

To insure continuity of operation two different types of power supplies were installed, one to be used with each transmitter normally, but either capable of handling both sets simultaneously in case of need. Although the photograph which



THE POWER EQUIPMENT

A description of the apparatus is contained in the text.

shows the power room and apparatus is not a recent one it gives a good idea of the equipment. Above a cabinet for supplies is the charging panel for the batteries which operate the receiver, monitor, and several different six-volt relays. The light radio-type storage cells have been replaced by husky banks of Willard stationary-type glass-encased cells which stand up better in heavy-duty service. Cabinet, charging panel, and high voltage generator are supported on a heavy steel frame. The rotating machinery is supported on cork to absorb vibration, and is mounted well above the high-water mark reached by our last New England flood. At the left is the switch which throws 220 volts on the driving motor for the high-voltage machine when actuated by the six-volt relay mounted in the same box. The large

metal box mounted on the wall is of  $\frac{1}{8}$ " steel. This cabinet is full of high and low voltage fuses, switches, six-volt relays, keying filters, center-tapped resistors and numerous other auxiliaries indicated in the power supply diagram, in addition to its main purpose, which is to house the mercury-arc rectifier, all its auxiliary keep-alive circuit equipment, the "bleeder" resistance and several component parts of the filter system.

culty in the use of mercury-arc rectifiers to arise from the "hash" set up by inductive kicks due to the interruption of the current in keep-alive circuits which makes reception impossible unless the arc and transmitter are some distance away. At W1MK there is none of this trouble since the arc is 100% shielded in the grounded iron cabinet, and even the control leads run through about sixty feet of conduit, also grounded. It is impossi-

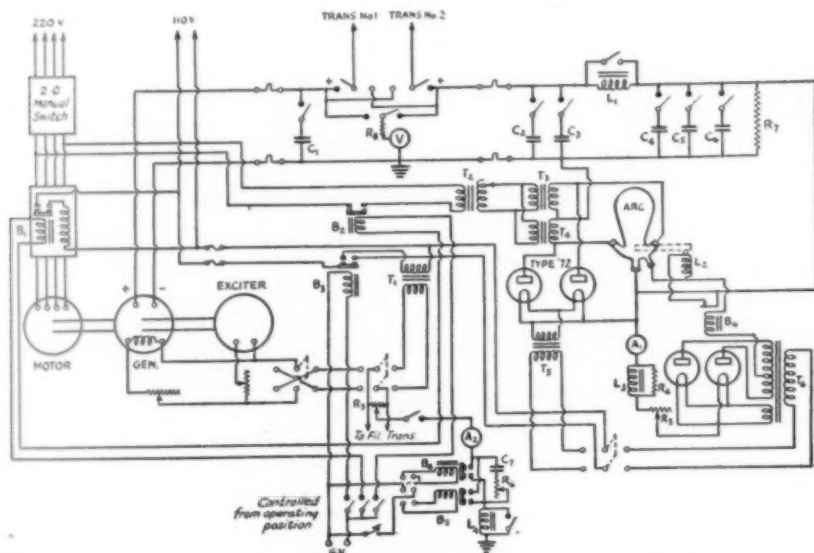


FIG. 1. — POWER SUPPLIES AND CONTROL EQUIPMENT

- T<sub>1</sub> — Filament transformer for '04-A's  
 T<sub>2</sub> — 1-kv. transformer with tapped secondary for regulating primary voltage on high-voltage transformers  
 T<sub>3</sub> — 2-kv. transformer, 110-2200 volts  
 T<sub>4</sub> — Filament transformer for '72's  
 T<sub>5</sub> — Keep-alive transformer, secondary voltage 0D, center-tapped  
 L<sub>1</sub> — 30-henry choke  
 L<sub>2</sub> — Solenoid for tipping arc  
 L<sub>3</sub> — Keep-alive choke, 5 henrys  
 L<sub>4</sub> — Keying choke, 12 henrys  
 C<sub>1</sub> — 4-μfd.  
 C<sub>2</sub> — 5-μfd.  
 C<sub>3-6</sub> — 2-μfd. each  
 C<sub>7</sub> — 2-μfd., 1000-volt condenser  
 R<sub>1</sub> — Generator field rheostat  
 R<sub>2</sub> — Filament rheostat for '04-A's  
 R<sub>3</sub> — Center-tap resistor, 75 ohms  
 R<sub>4</sub> — 2000 ohms  
 R<sub>5</sub> — 30 ohms, adjustable by clip  
 R<sub>6</sub> — 15-ohm rheostat  
 A<sub>1</sub> — 0-4 amp. d.c. ammeter  
 B<sub>1</sub> — Starting relay for generator  
 B<sub>2</sub> — Line relay for power transformers  
 B<sub>3</sub> — Line relay for keep-alive transformer or '72 filament transformer  
 B<sub>4</sub>, B<sub>5</sub> — Keying relay and spare  
 B<sub>6</sub> — Solenoid relay for arc-starting mechanism

During 1929 a pair of Type '72 rectifier tubes were added and used for a time. These could be used interchangeably with the mercury-arc rectifier equipment and offer certain advantages in neatness, quietness in operation and compactness, but it became apparent that once the initial investment in accessory equipment for the mercury-arc circuit had been made, replacement of the Tungars in the keep-alive circuit and of the arc itself could be made at a lower cost. Because of this operating economy the original arc-rectifier equipment is still in use.

Many amateurs have found a common diffi-

culty to tell by the receiver if the arc is running — unless you press the key.

Individual capacity units in the filter system can be removed by operating the "disconnect" switches that are in series with each condenser. On occasions when there have been troubles in the filter system this has made it possible to remove quickly the defective unit without any great delay in normal operating schedules. All equipment in a station like W1MK gets severe service and must be rated for continuous operation. We prefer to service the equipment and locate troubles outside of operating hours and have therefore

installed plenty of fuses and "disconnect" switches for the isolation and ready location of trouble which is always sure to crop up sooner or later where many circuits and parts must function simultaneously.

Two 50,000-ohm 44-watt resistors in series across the 2000-volt filter system improve the regulation and protect filter condensers from ripples and transients, at the same time protecting the operator from some deadly "jolts" by draining the charge off the condensers at the instant the high-voltage transformers are taken off the line.

Three two-inch conduits contain all the wires connecting the power-supply equipment, low, high, and intermediate voltages, to the apparatus in the operating room.

#### STATION EQUIPMENT

The best obtainable electrical and mechanical construction was desired in the transmitter for the new station made possible by the Board's action. The main unit must be capable of working in different amateur bands; it must meet certain further specifications, as must also the second transmitter or auxiliary, although the requirements for this were easier to meet.

The t.p.t.g. transmitter shown in the photograph, using two Type '04-A tubes, was obtained as the best answer to the first problem. This set is extremely flexible and with a little experience any amateur can change frequency from band to band quickly and easily once the proper settings have been determined. Ruggedness in construction insures long useful life. Electrically self-controlled, the circuit (shown in Fig. 2) is very simple as well as immune from most of the troubles which may be expected with a multi-stage transmitter. Such a set is ideal for quick frequency changing, break-in operation, etc. Equipped with adapters for Type '52 tubes it can be made to work at 14 mc. The limitations of '04-A's make it desirable not to attempt operation on frequencies higher than 7 mc., since the circuit will become unstable in the vicinity of 14 mc. unless special precautions are observed, and in any case tube life may be shortened.

When this t.p.t.g. transmitter was first placed in operation at Headquarters one unusual trouble was noted. Good results were obtained except that at 3575 kc. after the first few dots and dashes had been transmitted the note became a perfect 500-cycle modulated affair. Everything was overhauled from power supply to filament bypass condensers, without result. The transmitter was suspended on cushioned shock absorbers — still no result. Finally, in desperation, after some weeks of looking for the "perfect d.c." it was found that insertion of rubber strips between each turn of both the plate and grid coils effected an absolute cure. Some wooden clamps were procured and provide the permanent remedy to this day. Apparently the interaction of the fields of the plate and grid coils was sufficient to start a mechanical vibration, which occurred only with the multi-turn coils used for the 3575-kc. frequency. Of course this would never have been noticed with a modulated power supply. For a simple difficulty it occasioned quite a lot of frantic trouble-shooting!

An auxiliary transmitter, a simple High-C Hartley circuit using one Type '04-A, was constructed and placed permanently on 7150 kc. for use mainly during simultaneous transmissions of

general information for members.

A completely rebuilt receiver was installed at the new station and served for most of 1928 operation. It was partially shielded but not completely shielded. As one visitor tactfully put it, "the r.f. from the transmitter didn't do it any good." But though the tube life may have been short, the sensitivity was good and many successful contacts were put through with its use.

A General Radio Precision Wavemeter was added to other equipment as a practical necessity for

keeping the station on frequency.

#### PROGRESS

In any station the best of equipment will wear out or become obsolete. Modern stations will remain modern only if those behind the station exert themselves. The history of this station, like that of most every really worthwhile amateur station, is a story of continuous improvements.

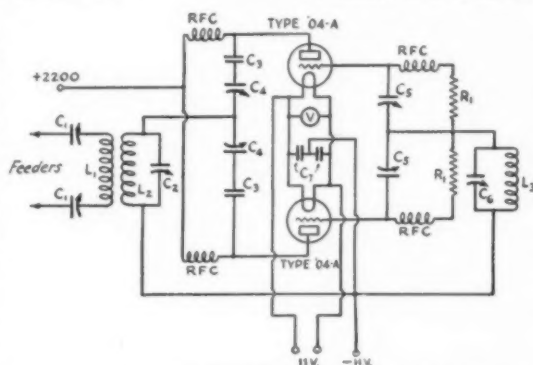


FIG. 2. — THE 500-WATT TUNED-GRID TUNED-PLATE TRANSMITTER

- |   |   |
|---|---|
| $C_1$ — 250- $\mu$ fd. transmitting condenser | tubing $3\frac{3}{4}$ " inside diameter |
| $C_2$ — 280 $\mu$ fd.                         | $L_1$ — 12 turns for 3500 kc.           |
| $C_3$ — .002 $\mu$ fd.                        | 7 " " 7000 kc.                          |
| $C_4$ — 100 $\mu$ fd.                         | $L_2$ — 11 turns for 3500 kc.           |
| $C_5$ — 100 $\mu$ fd.                         | 5 " " 7000 kc.                          |
| $C_6$ — 280 $\mu$ fd.                         | $R_1$ — 5000 ohms                       |
| $C_7$ — .08 $\mu$ fd.                         | RFC — Radio frequency chokes            |
| $L_1$ — 10 turns of 5/16" copper              |   |

In most amateur stations it is a simple matter to shut down to rebuild or experiment. Not so with WIMK. The station has very definite responsibilities to the membership and every effort has been made to make operation every scheduled night go off just as per schedule — with a few extra nights of operating thrown in for good measure. At the same time constructional projects have not been neglected by any means.

It is completely shielded and all power supply leads are by-passed, which results in very low r.f. pick-up from the powerful transmitters which are adjacent. A noticeable improvement in tube life, and more important, a reduction in noise level, resulted from the installation of the new receiver. As shown in the diagram, transformer-coupled audio amplification is available, or "peaked" amplification to improve selectivity

is provided at the throw of a switch. Three 1000-turn honeycombs tuned with a .01- $\mu$ fd. paper condenser are plugged in permanently, or may be replaced by the primary of 712 transformers or other peak-producing combinations if desired. A stage of '22 untuned r.f. amplification precedes the detector and recently this has been made into a tuned radio-frequency stage, appreciably boosting the signal level. An ample number of coils is provided for all the amateur and expedition bands, and a plug-in midjet condenser can be placed across the regular two-section band-spread condenser to boost coil ranges to almost any frequency that may be required. Possibly an

a.c.-operated receiver may supplant the present model at some future date but other jobs loom ahead of that in importance.

#### THE NEW TRANSMITTER

Excellent results were obtained with both t.p.t.g. and auxiliary Hartley transmitters from the date operation of the new WIMK commenced. However, difficulties were encountered because of tube troubles and certain limitations applying to any self-controlled transmitters made themselves felt.

Satisfactory frequency stability has always been obtained on the 3575-ke. frequency. One trouble that could not be overcome was a certain frequency drift that would invariably occur during transmission on the higher frequency bands because of changes in the spacing of the tube elements ('04-A's) with even small temperature changes. The transmitter, while steady and easy to copy, would "climb" gradually to a slightly different frequency, the change being of the order of several kilocycles with inputs 75% normal, so it was necessary for receiving operators to re-tune slightly for the signal after an interval

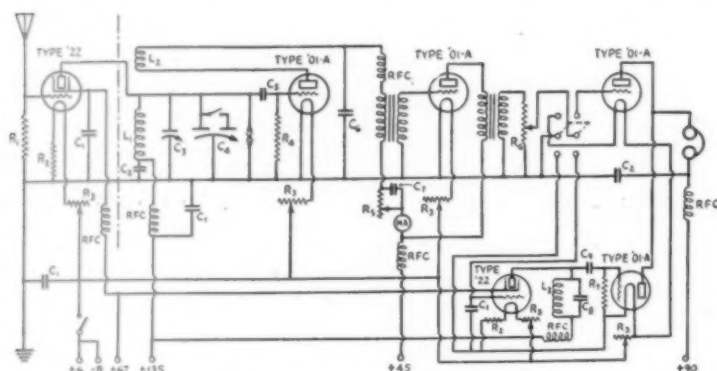


FIG. 3. — WIMK RECEIVER

$C_1$  — 1  $\mu$ fd.  
 $C_2$  — .005  $\mu$ fd.  
 $C_3$  — Beat-note condenser — two plate midjet  
 $C_4$  — Rebuilt condenser having two stator sections adjusted for band spreading  
 $C_5$  — 100  $\mu$ fd.  
 $C_6$  — .002  $\mu$ fd.  
 $C_7$  — .35  $\mu$ fd.  
 $C_8$  — .025  $\mu$ fd.  
 $C_9$  — 500  $\mu$ fd.  
 $R_1$  — 10,000 ohms

$R_2$  — 8 ohms  
 $R_3$  — 30-ohm rheostat  
 $R_4$  — 6 megohms  
 $R_5$  — 100,000-ohm variable resistor  
 $R_6$  — 500,000-ohm " "  
 $R_7$  — 100,000 ohms  
 RFC — Receiver-type r.f. choke

No data on coils is given because they must be made by the "cut-and-try" process to cover each band. Values are approximately the same as with any receiver designed for band spreading.

A listening monitor and a new receiver were recognized as necessities of the first water. These were built by the writer and by "RP" respectively and placed in operation in the station early in 1929.

The circuits of both monitor and receiver are shown. Both instruments are built in aluminum cabinets. The monitor consists of a detector and two-stage amplifier, and is provided with a regeneration control. It is in reality a rather complete receiver, lacking only an antenna coupling coil. External batteries are normally connected for operation of the listening monitor by the Yaxley cable-plug which is located in the rear center. Additional "A" and "B" dry-cell batteries are fastened to an aluminum shelf inside the monitor with brass straps and may be used for operation as a 100% "portable" monitor or receiver, and are connected in the circuit by throwing two double-pole double-throw switches. A single additional tube is provided in a crystal oscillator circuit, and a shelf with switch-jaw elements makes it possible to plug in a crystal for monitoring or measuring purposes.

The new receiving set requires little explanation.



of no transmission. Reducing plate voltage and current might limit the amount of change but would not get around the trouble altogether.

Therefore it was decided that a new main unit for the station, to have excellent frequency stability as its goal, and using modern high-frequency tubes, must be constructed. The t.p.t.g. set must continue to "hold down" 3575 kc. where its performance left little to be desired, but a new transmitter should be added for all work in the 7- and 14-mc. bands where it is hardest to maintain a station on a single channel. Space limitations made it difficult to see where any amount of apparatus could be installed, but it finally appeared that the best location for the new transmitter would be in place of the superseded auxiliary unit beneath the operating table. A shelf and drawer were removed to make the space available and a design as compact as possible worked out after preliminary experiments to determine the best possible set-up. While no amateur will have occasion to duplicate the exact arrangement or combination of equipment about to be described, it is believed that many of the features involved can perhaps be modified and included in stations of various size where oscillator-amplifier transmitters are being considered in the interest of improved frequency stability.

The new high-power unit had to be adjusted to work from the existing high-voltage plate supplies, for economy's sake if for no other reason. The oscillator must operate as a frequency control with plate voltage as low as practicable to keep temperature changes in the tube and in the crystal itself (when used) to an absolute minimum. A number of amplifier stages and doubler stages to supply adequate excitation to the high-power end in spite of low voltage on the control end must be incorporated. Shielding must be used in low-power and intermediate stages to eliminate undesired feed back, especially where the equipment must be confined in a small space. Separate power supplies for low- and high-power ends on the new transmitter were desired not only to prevent coupling between stages through the power supply but to avoid unnecessary losses in resistors and fluctuations in plate supply voltage that would endanger the equipment and make adjustment of the low-power end unduly difficult because of poor voltage regulation. If and when crystal control was to be used it should be possible to shift from one crystal to another at the will of the operator. Also, in a drafty room

subject to wide temperature variations the crystal must be protected from physical changes from any source, and preferably housed in a mounting held at constant temperature to minimize frequency changes as much as possible. A plug-and-jack metering system was considered desirable both to eliminate the necessity for a large number of meters and to make it possible to quickly adjust each stage, to locate troubles, defective tubes, etc.

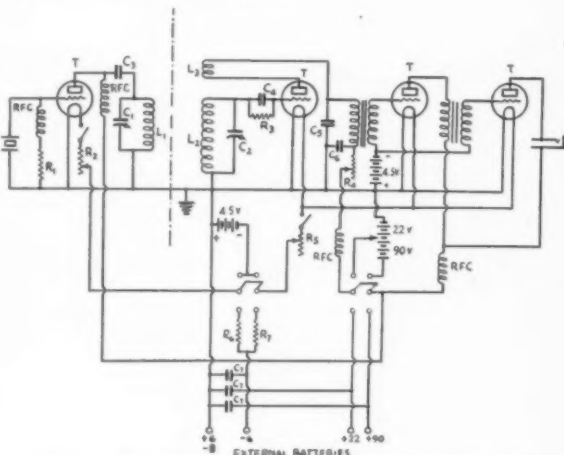


FIG. 4.—THE MONITOR AND CRYSTAL OSCILLATOR

$C_1$ —350  $\mu$ fd.

$C_2$ —75  $\mu$ fd.

$C_3$ —.006  $\mu$ fd.

$C_4$ —100  $\mu$ fd.

$C_5$ —.006  $\mu$ fd.

$C_6$ —.25  $\mu$ fd.

$C_7$ —1  $\mu$ fd.

$R_1$ —8 megohms

$R_2$ —25-ohm rheostat

$R_3$ —4 megohms

$R_4$ —50,000-ohm variable resistor

$R_5$ —10-ohm rheostat

$R_6$ —42 ohms

$R_7$ —16 ohms

RFC—Receiver-type r.f. chokes

$L_1$ —28 turns of No. 22 wire, space wound on  $1\frac{1}{4}$ " form ( $1\frac{1}{2}$ " length winding)

$L_2$ —35 turns of No. 30 d.s.c. on old tube base (space-wound to cover the 3500-ke. band)

$L_3$ —8 turns of No. 30 d.s.c. on same tube base  $\frac{1}{4}$ " from  $L_2$

T—The monitor may be used with Type '99 or '30 tubes for portable use, but is ordinarily used with '01-A's in the station because of their ruggedness

In the high-power stages it was decided to use Type '60 and Type '61 tubes, these tubes being as readily available as any high-power, high-frequency tubes, and being screen-grid "bottles" the necessity for neutralization might thus be avoided and undesired feedbacks and instability kept at a minimum. The problem was to plan a circuit layout giving adequate gain, providing the necessary doubling and quadrupling of frequency, and sufficient excitation for both 7- and 14-mc. operation, all without too much difficulty in changing frequency.



Preliminary experiments indicated that three Type '10 tubes might be controlled by a 3500-kc. crystal and arranged in doubler-amplifier or doubler-doubler combinations for 7-mc. or 14-mc. operation. However, a single '10 tube gave a mighty low output at 14 mc. although perhaps satisfactory from the 7-mc. operating standpoint. It was useless to attempt to increase 14-mc. output by adding another '10 in parallel; this was tried but the inter-element capacity of the tubes,

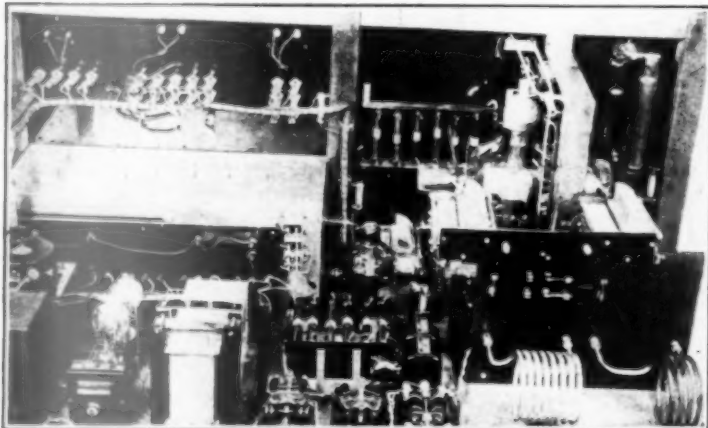
another Type '10 tube which may be operated either as a 14-mc. doubler or as a neutralized amplifier on 7 mc. The output of this tube excites a push-pull amplifier using two Type '10 tubes which may be operated on either 7 or 14 mc., giving sufficient output to fully excite the '60 on either band. All the amplifiers following the crystal tube are neutralized, even when operating as doublers, to prevent undesired feedback between stages and to allow the transmitter to be

shifted from one band to the other with a minimum of adjustments.

Since the maximum of flexibility is necessary in a transmitter which must be shifted rapidly from one frequency to another and from one band to another to meet schedules (and avoid QRM, when necessary), the tuning condensers on each stage except the last are made sufficiently large to cover both 7 and 14 mc., thereby eliminating the necessity for plug-in inductances. The crystal oscillator and the first doubler are permanently tuned to 3.5 mc. and 7 mc. respectively. The only coil changing necessary is in the tank of the '61 stage. The neutralizing systems employed on the low-power stages are designed to permit wide changes in frequency without necessity for readjustment of the neutralizing condensers. The screen-grid tubes in the two final stages do not require neutralization. The tank circuits are Low-C on 14 mc. and fairly High-C on 7 mc.

The second doubler output tank is fed d.c. in the center, locating the voltage node at that point

and making both ends of the tank "hot." This method of connection is ideal for feeding a single-ended stage into a push-pull amplifier, because it obviates the necessity for inductive coupling between the stages and requires no additional apparatus. At the same time it also makes possible easy neutralization of the single-ended amplifier. Coupling out of the push-pull stage into the single Type '60, however, cannot be accomplished in quite so simple a manner,



COMPLETE ASSEMBLY OF THE NEW 500-WATT OSCILLATOR-AMPLIFIER TRANSMITTER AT WIMK

Five Type '10 tubes in the aluminum cabinet (at left) are followed by '60 and '61 screen-grid amplifying stages (at right). The jacks to check filament voltage as well as individual plate and grid currents on each tube are mounted on the panel above the shielded cabinet. External C-bias batteries are connected through a Yazley cable-plug. The 7-prong-socket is below the platform which carries the whole assembly. To the left of the Type '66 rectifiers is the special filament transformer for all Type '10 tubes and the '60. At the right is a Thordarson 50-henry choke and the filter condenser block. One telegraph-sounder 6-volt relay connects all filament transformers to the 110-volt source at the same time a similar relay in the power supply room connects the stand-by circuits for the mercury-vapor high-voltage rectifier. A second telegraph-sounder relay turns on the 600-volt transformer of the low-voltage power-supply unit shown in the left foreground at the same time another relay in the power room actuates the 2000-volt equipment. The Leach relay at the right is the keying relay for this transmitter. Just back of the relays on the same sub-base is mounted the 225,000-ohm voltage divider from which bias for blocked-grid keying of '60 and '61 stages is obtained. The key-thump filter may also be seen just behind the relays.

The screen-grid resistors for the '60 are mounted back of the panel above the '60. On the extreme right of the assembly back of the panel are screen-grid resistors for the '61. The feeder condensers are on a skeleton mounting in front of the '61 and obscure some of the detail of the '60 and '61 tank circuits, also the r.f. chokes which are mounted directly at the tube terminals. The screen-grid by-pass condensers are mounted under the platform to make the leads short and get these bulky units out of the way. Above the antenna coupling coil is the switching arrangement which makes it possible to connect an r.f. ammeter in either side of the feed line. The four-turn tank coil of the '61 used for 14-mc. operation is shown in place on the extreme right.

fairly high in the first place, added when the tubes were paralleled, effectively by-passing what little grid excitation could be obtained. After much experimenting with different tube combinations to build up the 14-mc. energy to a value sufficient to fully excite the Type '60 amplifier, the line-up shown in the transmitter diagram, Fig. 5, was decided upon as being the most suitable. A Type '10 oscillator on 3575 kc. is followed by a 7-mc. doubler, which in turn feeds into

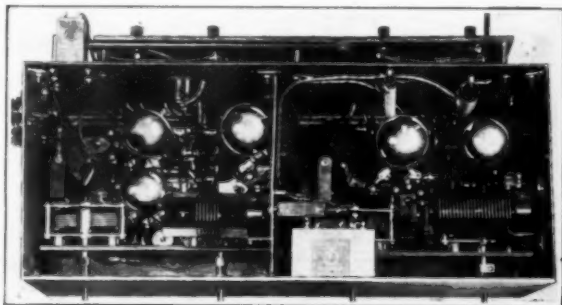
since a direct connection of one end of the push-pull tank to the filament of the following tube (or coupling at this end through a condenser) would place one end of the tank at ground potential with respect to r.f. and unbalance the amplifier. It was found that the excitation was ample with the grid connection to the '60 taken off one end of the push-pull tank, leaving the other end of the tank free. The push-pull stage was highly desirable because in it the tube capacities are in series, which eliminated the objection to two tubes in parallel mentioned previously.

During the preliminary testing of the transmitter after the constructional work had been finished a rather unusual condition made itself apparent. There was evidence of a strong parasitic oscillation in the push-pull stage which absolutely wrecked the frequency stability and quality of the signal. The usual remedies for such parasites were tried without result — furthermore it was impossible to determine the frequency of the parasitic, even though frequency meters which would go down to three meters were available. The answer was finally found to be in the r.f. choke coils which were in the d.c. plate and grid leads. Evidently the two chokes (ordinary commercial pie-wound chokes) acted like the plate and grid coils of a tuned-plate, tuned-grid transmitter, and a low-frequency oscillation was set up. The grid and plate tank coils on this stage offered practically no reactance to low frequencies, with the result that there was a vigorous oscillation. Removal of the plate and grid chokes in the push-pull stage completely eliminated this trouble.

The keying system used with this transmitter is one which departs somewhat from usual amateur practice, although often employed in commercial transmitters. It is a form of "blocked-grid" keying, utilizing a voltage-divider across the high-voltage plate supply so arranged that when the key is up part of the plate voltage on the last two amplifiers is applied between the grids and filaments of the tubes so that the plate current on both is reduced to zero. It is a very effective form of keying, and one which gives complete cut-off of power output. As shown in the transmitter diagram, resistors to the value of 25,000 ohms are connected across the 2200-volt supply, with a tap brought out at 75,000 ohms from the negative end. The negative terminal is connected to the positive side of the "C" bias batteries, while the 75,000-ohm tap is connected to the filament center-taps of the '60 and '61. The key is connected directly across the 75,000-ohm resistor, and when closed short-circuits it. When the key is open the drop across the 75,000-ohm

resistor [560 volts] acts as additional bias for the last two amplifiers. The Type '10 tubes in the transmitter are not keyed, but run continuously during an entire period of transmission.

One other feature of the transmitter is worthy of some comment. The desirability of a plug and jack metering system has been mentioned previously, and in order to measure plate current in each stage a separate jack is provided in the plate



THE LOW-POWER STAGES OF THE NEW TRANSMITTER

From right to left are the 3500-ke. oscillator, 7000-ke. doubler, 7000-ke. neutralized amplifier or 14,000-ke. doubler, and neutralized push-pull amplifier working on either 7000 or 14,000 ke. All tank coils (of No. 14 wire on notched forms) are placed at right angles and as far apart as possible to eliminate undesired feedback. All terminals for plate, grid and filament circuits are brought out to the bakelite panel shown at the top of the photograph (back of the box). Behind the terminal board are the center-tapped resistors for each tube. The resistor at the right is the 10,000-ohm unit which drops the oscillator plate voltage to 220. Individual r.f. chokes and by-pass condensers are used in all plate and grid bias leads with the exception of the third and push-pull stages.

Grid-leak bias is used on the oscillator to avoid any danger of feedback through a common C-bias source. A wooden base is used in each half of the cabinet for mounting the parts. Neutralizing condensers are supported on brass angles screwed to the baseboard. A slot sawed in the condenser shafts makes adjustment possible by use of the gadget shown resting on the supports for the terminal board.

circuit of each tube. If common filament supply had been used for all the Type '10's in the transmitter these jacks would have had to be placed in the positive high-voltage lead to each tube, which would have meant that the jacks on the panel would be at a rather high d.c. potential above ground and the operator would have to be extremely careful in handling the plugs. To bring each jack to ground potential, therefore, it was necessary to have a separate filament supply for each tube so the jacks could be placed in the negative leads. A special transformer was built for this purpose, employing the core and primary winding of an old transformer of suitable power rating. Separate filament windings were put on this transformer for each of the Type '10 tubes and also the Type '60, the latter of course requiring a higher filament voltage. An entirely separate transformer furnishes filament power to the '61. A slight correction of plate-current readings is necessary to take grid current and screen-grid current into account with this method of connection. This is important only on the '60 and '61



stages, where the total space current may differ considerably from the plate current.

Although the oscillator is designed primarily for crystal control, it may be made self-controlled by switching over to a resonant grid coil in place of the crystal, thus allowing the transmitter to be set on any frequency desired within the amateur bands. It is usually operated, however, with the crystal in the circuit.

The following table shows the actual measured values of plate voltage, plate current and grid bias on each of the tubes in the transmitter under operating conditions:

	$E_b$	$I_b$ (ma.)	$E_c$
Oscillator, Type '10.....	220	36.5	-22 (leak)
1st doubler, Type '10.....	580	40	-75
2nd amplifier or doubler, Type '10.....	580	60	-65
Push-pull amp., Type '10 (2)	580	160 (total)	-65
Power amp., Type '60.....	2200	200	-370
Power amp., Type '61.....	2200	380	-60

The bias on the '61 is not at all critical, and 45 to 135 volts may be used under the operating conditions. With higher plate voltage, however, more bias would be required. The tube is being run well under its normal rating in this transmitter, both to prolong its life and to utilize the present 2200-volt power supply without adding expensive equipment for higher voltages. Of the total bias on the Type '60 tube, 120 volts is supplied by the 60,000-ohm leak, and the remainder by batteries.

#### THE TEMPERATURE-CONTROL BOX

Real frequency stability, even with crystal control, is not attained unless the crystal is maintained at constant temperature. The low plate voltage used on the crystal tube is advantageous because the crystal does not heat from too-strong mechanical vibration when the transmitter is operating. The remaining problem is to keep the crystal temperature constant in spite of the wide variations in room temperature which are encountered at our location. The temperature-control box shown in the photograph is designed to take care of this factor.

The outside box, made of quarter-inch wood stock, is  $9\frac{1}{2} \times 14\frac{1}{2} \times 14\frac{1}{8}$  inches. The inner aluminum box is of riveted construction and is large enough to contain three crystals and their holders on the bottom floor. Between the crystal chamber and the heaters is an attenuation layer of asbestos wool  $3/32$ " thick, and a  $1/4$ " transite box. The heaters are mounted on each face of this box. Eight  $1/4$ -ampere Ohmspun heaters are used, one each on the top, bottom and ends, and two each on the front and back. This unit sits in the center of the outer box.

Transite is necessary for mechanical rigidity of the inner hinged box shown in the photograph, but asbestos mill board (which is poorer mechanically, but a better heat insulator) is the material used in the outer-box construction.

$1/4$ -inch slabs of Transite are used for partitions and double air spaces, two in series between the inside chamber and the outer wall, built into the sides and bottom. Wood stock is used for the outside container and for the different supporting corner posts and cleats for holding the Transite partitions.

Since this temperature-controlled box is designed to remain connected across the 110-volt a.c. line continuously, heat insulation is impor-



THE TEMPERATURE-CONTROL UNIT

A special Faichney 20-50° C. angle thermometer is mounted on the front and the Cenco bi-metallic thermo-regulator on one end of the box. One of the eight Ohmspun heater units is shown mounted on the lid of the hinged inner box. Trunk clasp fastenings effectively pull down the cover and seal the opening

tant. This is the reason for using two compartments instead of a single dead-air space around the inner chamber. Considerable savings in the electric light bill may be made by seemingly insignificant improvements in the heat-insulating properties of the box. For a box designed to reach a constant temperature more quickly, fewer air chambers are required in the interior construction and a thinner attenuation layer is advisable to permit the crystal to get up to operating temperature in a reasonable length of time.

The cost of such a home-built box to hold three crystals is approximately \$30, which, of course, does not include labor, the principal item. The box is assembled for the most part with small nails and screws, the cost mentioned including the special "angle" thermometer (20 to 50 degrees C.), the Cenco thermo-regulator, and two trunk clasps for clamping the cover down tightly and preventing heat leakage.

The precision of the regulation of the bi-metallic type regulator is approximately plus-or-minus  $1/4$ -degree Centigrade under the best conditions



and under fair conditions a temperature control of plus-or-minus one degree Centigrade is obtained. Of course the inner box maintains the crystal at a temperature much more constant than this, which is the variation which obtains in the air chamber. The crystals at W1MK are held at 45° C. While the precision of the regulator itself is not so great as may be obtained with mercury-type thermostats, the fact that these require a relay and an auxiliary battery (since the mercury



ROBERT B. PARMENTER, "RP" OF W1MK

column cannot handle much current) make them less desirable for most amateur installations. To handle over 300 watts a relay is recommended for use with even this type of regulator, but the contacts will handle that amount of power supplied at 110 volts with just an occasional cleaning.

Good circulation of air is essential in a temperature-control box to insure uniformity of temperature in all parts. The thermostat must be installed where the circulation of air is most rapid to secure best results. A .25- $\mu$ fd. condenser is used across the contacts to reduce sparking, and a small pilot lamp is connected across the contacts to show that the device is in operation.

#### OPERATION AND PERSONNEL

The present station is operated several hours daily (except Wednesday and Saturday) on 3575 or 7150 kc., and has been on the air regularly since February, 1928. Many hundreds of contacts with amateurs and members have been recorded. Certain periods are provided exclusively for schedules. General operation in other published periods permits communication with the many

who wish occasional contact with Headquarters for any reason. Information of general interest and timely character is addressed to A.R.R.L. members twice each evening of operation. Reports indicate that such special and official broadcasts are copied by a large "audience." The traffic records of the station speak for themselves as well as the performance in such special communication problems as the coöperation with "The Arctic Patrol" (Army Air Corps flight January, 1930), work with WSBS, DAIV and other plans of lesser magnitude.

For regular operation at W1MK ability of several kinds is required. The operator must be able to send slowly or speedily as a situation demands. Patience, tact, accuracy (above all), and initiative in building up traffic outlets properly distributed geographically — all these and other qualities are needed. The keeping of schedules and handling of traffic must be understood thoroughly. The operator must be able to set an example in every department of operating procedure. The discipline of the commercial operator together with the viewpoint of the ideal amateur is required. How fortunate we were in securing this sort of an operator is well known. Robert B. Parmenter, formerly of W9TW, KUTZ, W9OX-W9WR came to Hartford in February of 1928 just as the installation was receiving the finishing touches. "RP" as he is familiarly known, has kept W1MK on the air ever since. Other operators visiting the station sit in for a twirl at the dials occasionally. Members of the Headquarters staff may be recognized when they operate by their personal "sines" which are listed in every issue of QST. In times of emergency which require that the station be on the air continually EV, AH and FH will usually be found to be the members doing volunteer duty behind the key.

Our Headquarters' Station often has to account for itself on extremely short notice. Since equipment has certain definite limitations, the facilities have sometimes been overloaded by overlapping operating programs dictated by circumstances of the moment. Suffice to say that the station must cater to many different types of operating activities dedicated to the interest of League members. The many schedules and obligations of the station make operating at W1MK a real job.

Much could be said about operating practices, observation of trespassers in and out of our bands, policy of acknowledging every QSL, adherence of different stations we schedule to the given frequency and time, transmission conditions in different bands and seasons, and like subjects, but these things make another story. Our present purpose has been simply to record the work of the station and to touch on the various parts of the equipment in a general way.



# Standard Frequency News and Schedules

## W1XP, W9XAN and W6XK in Regular Operation—Special Calls Assigned to S. F. Stations

**T**HE early morning hours of November first, with but a few DX hounds as witnesses, saw the completion of the A.R.R.L. Standard Frequency System's organization program. Right on the tick of 4:00 a.m., P.S.T., the new West Coast station, W6XK, opened up with its first scheduled transmission. We knew that Harold Peery and his assistants had made a good job of it because the signals rolled in a good QSA 5 here in Hartford, with a good d.c. note and right on frequency.

A special call for the standard frequency transmissions had been assigned to the Elgin station. It is W9XAN. The Round Hill station will continue to sign W1XP. The description of the standard frequency equipment at the latter station, which was tentatively scheduled for this issue of QST, will appear in the January issue instead. The article is by Howard Chinn and is packed with information on frequency measurement and the method of transmitting standard frequency signals as well as a wealth of constructional data on frequency standards, multi-vibrators and other equipment.

The three stations are on for all scheduled transmissions. Unfavorable conditions and skip-distance effects will account for failure to hear transmissions on some frequencies at certain distances and must be taken into account. QRM continues to be a serious handicap and many amateurs have suggested that those amateur stations operating on the frequencies used during a standard frequency transmission stand by while their frequency is being transmitted. This would require only an eight-minute "QRX" and would mean a lot to the fellows who are trying to use the s.f. signals. Let's have a little more cooperation and a reduction in QRM.

Here are the schedules for December and January. The schedules for December are the same as published in November QST with the exception that W9XAN's Schedule BX on December 6 has been eliminated. This early morning schedule will be transmitted once every four weeks by W6XK, however.

### DATES OF TRANSMISSION

Date	Schedule	Station
Dec. 5, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
Dec. 7, Sunday	BB	W9XAN
	C	W6XK
Dec. 12, Friday	C	W6XK
Dec. 14, Sunday	C	W1XP
Dec. 19, Friday	A	W1XP
	B	W9XAN
	B	W6XK

Dec. 26, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
Dec. 27, Saturday	BX	W6XK
Dec. 28, Sunday	C	W8XAN
Jan. 2, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
Jan. 4, Sunday	BB	W9XAN
	C	W6XK
Jan. 9, Friday	C	W6XK
Jan. 11, Sunday	C	W1XP
Jan. 16, Friday	A	W1XP
	B	W9XAN
	B	W6XK
Jan. 23, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
Jan. 24, Saturday	BX	W6XK
Jan. 25, Sunday	C	W9XAN
Jan. 30, Friday	BB	W6XK
	B	W1XP
	A	W9XAN

### STANDARD FREQUENCY SCHEDULES

Friday Evenings Schedule and Frequency			Friday and Sunday Afternoons Schedule and Frequency		
Time (p.m.)	A	B	Time (p.m.)	BB	C
	kc.	kc.		kc.	kc.
8:00	3500	7000	4:00	7000	14,000
8:08	3550	7100	4:08	7100	14,100
8:16	3600	7200	4:16	7200	14,200
8:24	3700	7300	4:24	7300	14,300
8:32	3800		4:32		14,400
8:40	3900				
8:48	4000				
Saturday Mornings Schedule and Frequency					
Time (a.m.)	BX				
	kc.				
	4:00	7000			
	4:08	7100			
	4:16	7200			
	4:24	7300			

The time specified in the schedules is *local standard time at the transmitting station*. W1XP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XK, Pacific Standard Time. Schedule BB transmitted by W1XP is intended particularly for European amateurs and starts at 2100 G.C.T. Schedule BX is transmitted especially for amateurs in Oceania and the Far East. It is transmitted starting at 1200 G.C.T. by W6XK. Reports on these special schedules are particularly desired, not only from overseas hams but from those in the Americas also.

Although the frequencies of the transmitting stations are not guaranteed as to accuracy, every effort is made to keep to within 0.01% of the announced frequencies. The frequency standards

are calibrated against the National Frequency Standard. Frequent checks on the transmissions are made by laboratories equipped with accurate frequency standards and the transmissions are also checked by the U. S. Department of Commerce monitoring stations.

#### TRANSMITTING PROCEDURE

The time allotted to each transmission is 8 minutes, divided as follows:

2 minutes — QST QST QST de (station call letters).

3 minutes — Characteristic letter of station, interrupted by call letters and statement of frequency. Characteristic letter of W1XP is "G," of W9XAN is "D," and of W6XK is "F."

1 minute — Statement of frequency in kilocycles and announcement of next frequency.

2 minutes — Time allowed to change to next frequency.

#### THE TRANSMITTING STATIONS

W1XP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Howard A. Chinn in charge.

W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.

W6XK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

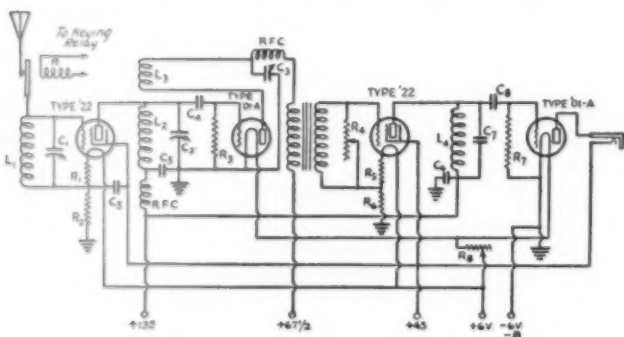
Do not forget to QSL the transmissions. All reports should be sent to the A.R.R.L. Standard Frequency System, Hartford, Conn. A record will be made at Headquarters and the report will be then forwarded to the proper station. S. F. report blanks can be obtained from Headquarters, free and postpaid, upon request.

QRX for Standard Frequency Transmissions.

— J.J.L.

#### Corrections

An error in the diagram of W7GP's receiver on p. 47 of the October issue put 45 volts on the fila-



ment of the peaked audio tube, with the result that there was no screen-grid voltage on the two Type '22's in the set or plate voltage on the last

audio amplifier. The corrected diagram appears herewith.

In the description of the new Ward Leonard plaque resistors on p. 40 of November *QST*, substitute the word "possible" for "impossible" in the third line above the photograph.

The left-hand term of the equation in footnote 3 on page 28, November *QST*, should have been  $(2\pi f)^2$  instead of  $(2f)^2$ .

In the article on "Volume Level Indicators," November *QST*, the circuit diagrams of Fig. 2 and Fig. 5 should be transposed. This will be immediately apparent to anyone familiar with the Modulometer.

The author has since written us that it might be better to use a volume-indicator coupling transformer of higher primary impedance than 500 ohms in Figs. 4 and 6, since a low-impedance primary will absorb too much power from the circuit. An ordinary audio transformer with the primary connected to the output of the speech amplifier should work well and draw negligible power.

#### ~~Pyrex~~ Strays

The name "Pyrex" is applied to several varieties of glass made by the Corning Glass Works, chief of which are the "chemical-resistant glass" and "electrical-resistant glass." In order to avoid clumsy wording, "Pyrex" will be used in *QST* to refer only to the electrical-resistant glass unless otherwise stated.

Louis S. Miller, Brockton, Mass., and W1ASZ, Pawtucket, R. I., have both written us suggesting that the insulating plugs on Ford transmission covers make excellent stand-off or lead-in insulators. The spring should be removed and a bolt inserted through the hole after the fashion of G.R. insulators.

A tip for the fellows who are too much inclined to "nerve sending" with the finger tips and who tire out trying to send a continuous message of any length: Try operating with the nails and knuckles of the first two fingers lying on top of the key with the thumb coming up under the edge of the flange to aid in making characters. The bent-over knuckles form a natural spring which relaxes easily after each pressure, with the result that there is less stuttering and balling-up of characters, and a long message is easier to send even at a good clip. There is no effort of hanging onto the key all the time.

— W9FO

## Experimenters' Section

### Converting the Four-Tube Receiver to A.C. Operation

By W. K. McCulla, W9AE-W9BTU \*

IT WOULD appear from the number of photographs in *QST* and from the personal experience of the author, that there are many of Hull's four tube plug-in coil and condenser receivers in operation among the gang.<sup>1</sup>

The following is a brief description of one of these receivers which has been successfully converted to a.c. operation, making use of plate

two plates spaced approximately  $\frac{3}{4}$  inch apart. The purpose of this condenser is to vary the beat note on a received signal without touching the main tuning control of the receiver.

The condenser  $C_4$ , normally a grid condenser, in this particular circuit merely acts as a blocking condenser. Grid bias for the detector tube is supplied by a small  $22\frac{1}{2}$ -volt "C" battery mounted in the set. The positive was connected to the ground, negative connected to the grid through a Hammarlund radio-frequency choke.

The regeneration is controlled by a 200,000-

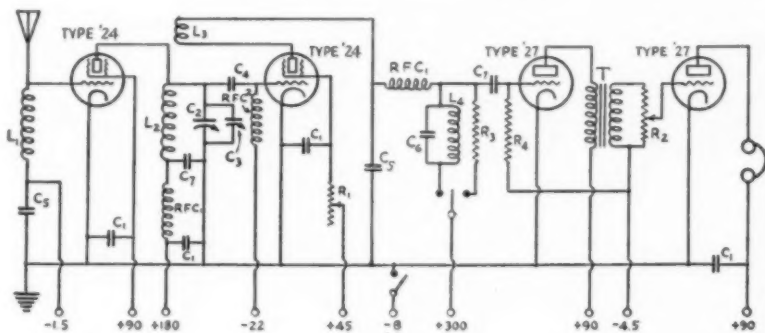


FIG. 1

- $L_1$ —Antenna coils wound on old tube base  
3500 kc. — 30 turns No. 30 a.s.c. wire  
7000 kc. — 30 turns No. 30 a.s.c. wire  
14,000 kc. — 15 turns No. 30 a.s.c. wire  
 $L_2, L_3$ —Same specifications as in original set  
 $L_4$ —Ford coil secondary without core  
 $C_1$ —1  $\mu$ fd.  
 $C_2$ —Tuning condensers same specifications as in original set  
 $C_3$ —Beat note condenser described in text  
 $C_4$ —.01  $\mu$ fd.

- $C_5$ —.002  $\mu$ fd.  
 $C_6$ —.015 audio tuning condenser  
 $C_7$ —.006  $\mu$ fd.  
 $R_1$ —200,000-ohm variable resistor  
 $R_2$ —200,000-ohm potentiometer  
 $R_3$ —75,000 ohms  
 $R_4$ —2 megohms  
 $T$ —Audio transformer  
 $RFC_1$ —Receiver-type r.f. choke  
 $RFC_2$ —Hammarlund Polarized r.f. choke

The heaters of the tubes are connected in parallel and supplied from a 2.5-volt transformer. Heater wiring is not shown in the above diagram.

rectification in the detector circuit, or as the broadcast fraternity call it, "linear power detection." The circuit is shown in Fig. 1.

In place of the 10,000-ohm resistance in the antenna circuit a four-prong socket was mounted on the sub-panel and a semi-tuned antenna inductance was substituted for the resistor. "C" bias for the first '24 is secured by a  $1\frac{1}{2}$ -volt dry cell shunted by a radio-frequency by-pass condenser, also mounted on the sub-panel.

In this particular receiver, no changes were made in the coil and tuning-condenser assembly with the exception that  $C_3$  was added. This was a small Pilot condenser in which all plates but one stator and one rotor were removed and those

ohm resistor in series with the screen-grid lead to the detector tube.

By means of a selector switch either a peaked audio system or one having a flat amplification characteristic is available. The optimum output coupling resistance for a screen-grid detector is in the neighborhood of 200,000 to 250,000 ohms. Experimenting with this receiver, however, showed that the voltage amplification was not greatly decreased or any great amount of distortion introduced by the use of a lower value of resistance. With a tickler coil suitable for use with a 200,000-ohm resistor in the plate circuit of the detector it was impossible to control oscillation with the switch on the peaked-audio system side, because of the smaller voltage drop through the choke compared to that through the resistor;

\*148 S. Genesee Street, Waukegan, Ill.

<sup>1</sup>Described in November 1928, *QST* and in the *Handbook*.

75,000 ohms was the most workable compromise and was therefore used.

If the receiver shows a tendency to have a bad fringe howl it can be eliminated by changing the value of the resistance  $R_4$ . In this particular case  $R_4$  had a value of two megohms.

The purpose of the switch in the  $B$  minus lead is to afford a means of taking the plate voltage off the tubes during transmission periods.

It will be noticed that the cathodes of all tubes operate at ground potential. It is the custom in most broadcast receivers to supply the grid bias

Judicious use of by-pass condensers aids in maintaining proper radio frequency paths. The lead from the condenser  $C_4$  to the tube is encased in a Carter screen-grid lead shield. No other shielding is used in the receiver.

Because of an unusually poor location, it is impossible at W9AE to hear any amateur stations other than those within the limits of the United States. It might be said, however, that an audio frequency volume increase of about two to one over the previous performance of the d.c. set resulted from the conversion to the circuit shown.

Some trouble was experienced with bad "bubbling" in some of the Type '24 tubes tried. This noise can be cured by placing them across a 6-volt battery for five minutes with no plate voltage on.

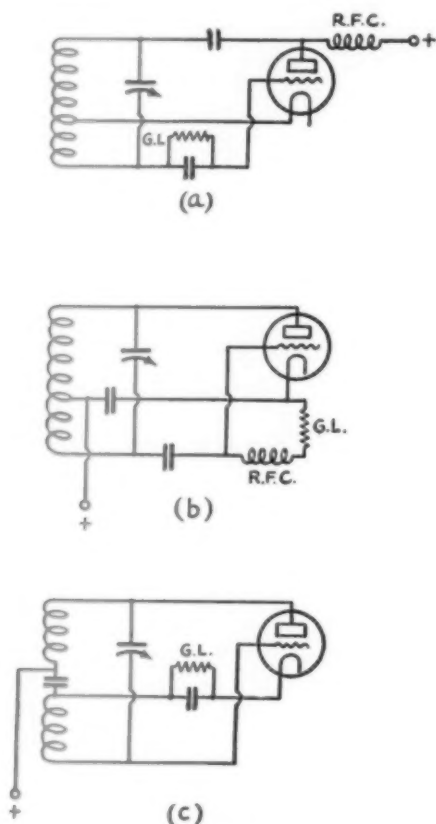


FIG. 2

between the ground and the cathode, to aid in hum elimination. However, in this receiver no particular advantage was noticed by so doing.

This set is operated with a.c. for the filament lighting and batteries to supply the plate current. Inasmuch as the total over-all drain is only eight milliamperes, no particular economy could be anticipated from building a power supply for the plate current. However, should it be desirable, no difficulty should be experienced in the construction of an adequate a.c. plate supply.

#### A CHOKELESS HARTLEY CIRCUIT

"A short time ago I set for myself the problem of devising a short-wave transmitter which would not require any radio-frequency choke, and which would yet be more simple than the Hoffman balanced Colpitts or the t.p.t.g. I took a pencil and paper and drew all the simple sending circuits with which I was acquainted and tried to alter them so as to eliminate the radio-frequency choke. I soon hit upon (b), Fig. 2, which is electrically the same as the ordinary Hartley circuit (a). However (b) still has a radio-frequency choke, but it is now in the grid circuit because the positive plate supply is connected at a point of zero r.f. voltage, while the grid leak cannot be connected at such point without splitting the coil as in (c). But let's look at our grid leak before discarding (b). Yes, it's made just like we suspected it was, out of a very large number of turns of very fine resistance wire wound on a porcelain tube. Why cannot it be used as a grid leak and grid r.f. choke rolled into one? There is no good reason why it cannot and at least one good one why it should be, for its high distributed resistance quite effectively keeps it from resonating at some frequencies and absorbing power.

"A 14,000-ke. transmitter was immediately built to test out this idea. It used a Type '10 tube as an oscillator and a wire wound 10,000-ohm resistor which cost 25 cents at the dime store in the rôle of grid choke and leak. The plate voltage was between 600 and 700 volts and introducing a plate r.f. choke did not change the plate current at all. A grid choke was not tried because the mere fact that the tiny grid leak did not burn up proved that it could not be carrying an appreciable amount of r.f.

"This circuit adjusts exactly like the standard Hartley circuit and requires fewer parts than any of the other 'chokeless' circuits with which I am familiar. The only precaution is to see that the grid leak is of a type which has inductance and to be sure that the grid condenser will stand the full plate voltage. The first layout that I built works



so beautifully that it is now the only transmitter in use at my station."

— Roger M. Wilson, W6AMJ

#### QSY WITH CRYSTAL CONTROL

"Having read Mr. Boyd Phelps' article on QSY with crystal control in the September issue of QST, I am prompted to write about the method in use at W9CIR. There is considerable satisfaction in being able to QSY to any part of the band in spite of the fact that only one crystal is in use.

"As is well known, in grinding a crystal a condition is often met where hundreds of parasitic oscillations are set up on each side of the main frequency. As an experiment the writer decided to try to build up the strength of these oscillations so they could be used to excite a buffer amplifier.

"A coil was placed in the grid circuit of the crystal stage to produce regeneration. This gave the desired results, and sufficient excitation was obtained to swing the grid of a buffer. The grid coil was then tapped at every turn, and this enabled the proper harmonic to be picked up and amplified. Later, a variometer was substituted for the tapped coil, and QSY was then possible over the entire 3500-ke. band.

"In shifting frequency it is only necessary to turn the variometer to a pre-determined setting and bring the tank circuit into resonance, returning the amplifier tanks, of course. The entire operation takes but a few seconds, and the crystal has at no time shown a tendency to jump to any other frequency."

— Frank Weidenbach, W9CIR-KGDA

#### D.C. HOUSE CURRENT SUPPLY FOR THE TRANSMITTER

"Just a line for the sake of those poor 'hams' who, as I, have d.c. in their homes and can't afford an m.g. or dynamotor, and who would at least like to QSO an adjacent district instead of being limited to that in which they live. 'B' batteries are always possible as a means of getting a little voltage for a plate supply, but they cost plenty and don't last very long. So one must resort to the house current.

"Now, it's easy enough to connect the plate to the positive and the filament center-tap to the negative; the problem arises in getting sufficient voltage to work something more than just locals. In most d.c. equipped houses this is done easily enough by drawing 220 volts from the line. Sounds impossible that 220 volts can be drawn from a 110-volt line, but it is done in this manner:

"Test the plug nearest the back of the house by sticking the two wires about 1½ inches apart in a potato. The one which turns the potato slightly green is the positive. Take this wire and test for ground (to find out which terminal of your

line at this point is grounded) by placing the middle terminal of an ordinary electric-light bulb on a place of good ground and touch the other terminal with one of the wires from the socket that you just tested. If the bulb lights when you touch it with the positive terminal, for example, then it stands to reason that the negative terminal is grounded. The same procedure is gone through for one of the sockets in the front of the house. It will usually be noted that the opposite terminal to that in the back is grounded. I say usually; because, knowing practically nil about house wiring, I don't know much except that my house and a couple of others that I have tested are wired this way. That is to say that if in the front the positive is grounded, the negative will be grounded in the back; or vice-versa.

"The rest is easy. Just take those two ungrounded terminals, one from in front, and one from in back, attach them to the transmitter at the correct places; and, Presto! you have 220 where you had before 110 volts.

"Any house line may, and probably will, have a slight commutator ripple. This gives a more or less good r.a.c. note, and if a pure d.c. note is desired, a choke of about 150 or 200 turns of No. 24 to 30 wire wound on an iron screw or some such will effectively eliminate the ripple. I have been using 150 turns of No. 28 wire on a 1½ inch screw and when the transmitter is tuned properly I get xtal reports consistently.

"With this rig and the xmitter circuit shown in December, 1929, QST I have worked all districts but the 6th and 7th. I hope to work them this winter by putting two Type '01-A's in parallel, instead of just the one tube.

"If this system of plate supply is used, it would be as well to get a couple of one-ampere fuses to put in the two line leads. Also, don't try any form of direct coupling because if the antenna is not perfectly insulated it is likely to form a short circuit between ground and one of the plate-juice leads. If you use one of those trick antennas wherein the feeder is supposed to be 9 feet off center, couple it to the tank coil by putting a fixed condenser in the feeder somewhere. This will not affect the signal as far as decreasing QSA goes and may help in giving a steadier, better note, depending on various conditions. At any rate, be mighty sure your antenna does not swing because there is a large capacity between antenna and ground, caused by the fact that the normal opposite pole of either of your plate leads is grounded. The least swing, therefore is very noticeable. To eliminate a slight swing that I got whenever the people in the houses opposite me put out clothes to dry (my antenna is attached to the pole there) I put one of those five-cent screen-door springs between the antenna and this pole and now have very steady sigs; even on Mondays!"

— A. F. Smith, Jr., W2BXJ



Some trouble can be saved in determining whether or not it is possible to get 220 volts from the house line by inspecting the service meter. If there are three wires coming into it the 220 is available, and may be taken directly from the two ungrounded terminals (on the house side of the meter, of course) or from sockets at different parts of the house as described above. Ninety volts of heavy duty "B" batteries in series with the 220 so obtained will make quite a respectable power supply for a Type 45 tube — or two of them in a rig such as was described in last month's QST.

#### THREE-BAND TRANSMITTING ANTENNAS

The problem of fitting an antenna for the three most popular bands into a limited space is always a puzzling one for the beginner, or for that matter for the advanced amateur as well. One suggestion was made in the January, 1928, issue of QST; we present herewith a few more from various sources.

The first of these is explained in the following letter from Don L. Spender, W1HD:

"A new antenna system for efficient operation in the three principal amateur bands (3.5, 7 and 14 megacycles) was recently installed at W1HD. It is suitable for erection in the limited amount of space available to the average amateur, and permits quick and easy shifting from one band to another. It has proved to be so eminently satisfactory in operation that it was decided to set forth the details for the benefit of any brother amateur who may be cramped for antenna space, as is the case at W1HD.

"The system consists of a fundamental Hertz antenna, of a length suitable for operation in the 7-mc. band. A length of 65 feet is usually about right. This is fed at the near end by a 16-foot Zeppelin feeder. The system as it now stands is suitable only for operation in the 14-mc. band.

"By cutting into the feeder two matched loading coils as shown in Fig. 3, wound in the same direction, of such proportions that the feeder will tune to 7 mc., the antenna may be operated in this band with practically the same efficiency as the usual 7-mc. Zeppelin antenna with 25- to 30-foot feeders. Then, by cutting out the loading coils, tying the feeders together and adding a separate wire (a so-called 'counterpoise') long enough to allow fundamental operation in the 3.5-mc. band the system will work in the latter band with good efficiency.

"The usual 7-mc. Zeppelin antenna may of course be operated, with a counterpoise, in the 3.5 megacycle band; but the system described is probably more effective, because the feeder is only of the order of 16 feet or so in length; hence, when used with a counterpoise, the transmitter is coupled at a point much closer to the voltage node than can be the case when using 25- to 35-foot feeders.

"The loading coils used at W1HD are 12 turns each of 12 gauge wire, space-wound on 2-inch

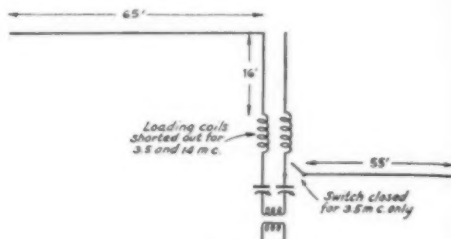


FIG. 3

bakelite tubing; the coils are wound in the same direction, and are set up parallel to each other a distance apart about equal to the spacing between the feeder wires. The number of turns on these coils was determined by reference to a thermammeter placed in the center of the antenna, with the transmitter operating at constant frequency and input in the 7-mc. band.

"The counterpoise used with the system here is 55 feet long; this length may vary slightly with different installations."

#### Southeastern Division Sections Consolidate

AT the suggestion of E. W. Mayer, K4KD, the Porto Rico-Virgin Islands Section of the Southeastern Division has been combined with the Georgia-South Carolina-Cuba-Isle of Pines Section operating under SCM Alexander, W4RZ. The amount of activity and number of stations reporting in Porto Rico and the Virgin Islands was deemed insufficient to warrant a separate section. Amateurs who previously reported their activities to former SCM Mayer should now report to SCM M. S. Alexander, W4RZ, 47 Second Avenue, S. E., Atlanta, Georgia.

#### Strays

A Pyrex test tube coated on outside and inside with tinfoil makes an excellent high-voltage blocking condenser which tests OK at 3000 volts.

— W6BRI

W7II suggests using a variable resistor in series with the negative high-voltage and center-tap of the filament transformer for obtaining "C" bias for a modulator tube. A separate filament winding is required for each tube so supplied. When the resistor is used, separate "C" batteries are not required, but it must be kept in mind that bias so obtained reduces the plate voltage by the amount of bias voltage.

# I.A.R.U. NEWS

Devoted to the interests and activities of the  
INTERNATIONAL AMATEUR RADIO UNION

President: H. P. MAXIM

Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society:  
THE AMERICAN RADIO RELAY LEAGUE, Hartford, Conn.

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American Radio Relay League  
Asociacion E. A. R.  
Associazione Radiotecnica Italiana  
Canadian Section, A.R.R.L.  
Deutscher Amateur-sende-und Empfangsdienst  
Experimenterende Danske Radioamatorer  
Lwowski Klub Krotkofalowcow  
Nederlandsche Vereeniging voor Internationaal Radio-amateurisme  
New Zealand Association of Radio Transmitters

Norwegian Radio Relay League  
Radio Society of Great Britain  
Reseau Belge  
Reseau Emetteurs Français  
South African Radio Relay League  
Sveriges Sandaresamatorer  
Union Schweiz Kurzwellen Amateurs  
Wireless Institute of Australia  
Wireless Society of Ireland

## Conducted by Clinton B. DeSoto

ONE of the most important questions affecting amateur operating procedure is always one for which a comprehensive, definite and determinate answer has never been secured, namely, the exact status of amateurs regulations in all the countries of the world.

As previously reported in these columns, one of the resolutions passed at the Antwerp Congress in July was concerned with this problem. It embodied a request to I.A.R.U. Headquarters to prepare a pamphlet containing data to be submitted by various sections giving the laws governing amateur radio in each country. This request was referred to Union member-societies in Calendar No. 4, and it is hoped that all members will coöperate to the extent of supplying copies of the amateur regulations existing in their respective countries.

This provides for only eighteen of the principal nations of the world, out of a possible total of seventy-odd countries wherein are located amateur stations. It is therefore that this present means is taken to request the amateur society of each country, colony, protectorate, or political land area, possessing individual regulatory codes, to forward to Union Headquarters at the earliest possible moment copies or translations of all laws affecting amateur operation. Other pertinent information concerned with licensing, numbers of active transmitters, memberships, etc. will also be appreciated. Where no active society is in existence, individual amateurs are requested to supply the needed information, in the interests of

international coöperation and to further international understanding.



Hartford Times Photo

HIRAM PERCY MAXIM, PRESIDENT OF THE I.A.R.U., SENDING OUT THE SIGNAL WHICH OPENED THE W.I.A. 1930 RADIO EXHIBITION AT MELBOURNE

(See the Australian Report in this issue.)

The effort of national amateur societies at the present time should be directed toward securing

the granting of as great a percentage as possible of the amateur privileges as set aside by the International Radiotelegraph Convention to amateurs in their own countries, and at the same time an eye should be kept turned toward future conferences empowered to alter the international code.

The primary step toward these goals should be acquainting the people of your nation, the officials of your government, with the value of the work done by amateurs.

Let us suggest here that you turn once more to the editorial in the September issue of *QST*, and read it over again. Now is the time to start a program of international publicity, with each society accepting responsibility for a national unit in the complete scheme. Now is the time to create that favorable background, that intense sympathy for the amateur and his endeavors, those good wishes for his ultimate success in the coming international parleys. It is urged that every amateur organization consider the establishment of a publicity service for its own country, for the purposes suggested above.

We return once more to the subject of DX time-tables. Have you checked over the results obtained thus far in the autumn season with those published in this department during the winter and spring months of last year? Do they still hold good as to times, places, bands, etc.? Probably they will have changed by some noticeably large degree. If such is the case it is your call to work out a comprehensive listing of the results obtained at the present time, making it as detailed and as definite as time and opportunity permit, and send it along to this department.

To show that we will do something about it, here's some dope on reception of W stations in New Zealand:

From August 15 to March 30

On 14 mc. stations are heard from 0100 to 0500  
On 7 mc. stations are heard from 0500 to 1200  
(Only Pacific Coast stations heard between 0800 to 1000)

On 3.5 mc. from 0700 to 0830

March to August

On 7 mc. from 0730 to 0130

Few stations heard on other bands and at other times.

Which brings to mind the unusual success enjoyed by New Zealand amateurs in hearing United States stations on the 3.5-mc. band, during the autumn months. According to reports eighty meters has been "hot" down at the Antipodes this year.

We record with pleasure the issuance of another WAC for 'phone certificate.



ONE OF THREE SIMILAR DISPLAYS SUBMITTED BY OA4J ALONG WITH THE ACTUAL CARDS IN APPLYING FOR HIS WAC CERTIFICATE

This time it is to Frank R. Neill, G15NJ, of "Ches-terfield," White-head, Belfast, Ireland. His is the fourth WAC for 'phone extant; the second in the British Isles.

One of the many interesting points brought out by amateur experience in connection with the study of wave propagation is the apparently intense strength of North American signals in Iraq, and the rela-

tively great difficulty experienced in receiving YI signals on the American end of the circuit. This could obviously be due, in the main, to the numbers of stations on this side and the resulting difficulty in hearing any foreign signals reliably, but experience seems to point out even more attenuation than can thus be accounted for.

Nevertheless, a surprisingly large percentage of U. S. WAC Club members have obtained their Asian contact through some one of the many enterprising stations located in Iraq.

#### AUSTRALIAN REPORT

By W. G. Sones, Dir. Fed. Publicity, W. I. A.

Mention has been made previously of the temporary concessions which Australian amateurs have enjoyed in regard to telephone operation between 1715 and 1200 kc. (150 to 250 meters) and also for operation in the 3.5-mc. band.

The most important item of news this month is a further extension of the concessions until January 31st, 1930. The use of the band is of course subject to non-interference with other services and there are very definite hours of working during the week-ends, particularly on Sunday between 10:30 a.m. and 12:30 p.m., 3:00 and 4:30 p.m. and 6:00 to 6:30 p.m. being prohibited. The hours have always been observed as a silent period, however, because of interference with B.C.L.'s, so that this is not in the nature of an additional restriction. Instead, it is regarded as a concession,

(Continued on page 64)

# Calls Heard



**VE2AP, John Stadler, 4334 Westmount Ave.,  
Westmount, P. Q., Canada**

w4afk w4ahl w4abt w4aim w4ft w4lm w4kl w4pe w4pf  
w4rx w4sk w4tiv w5aak w5ahc w5aly w5alq w5aaz w5bay  
w5ani w5bii w5pa w5rr w5td w5uf w6afi w5aqj w6atj w6ac  
w6bxc w6biv w6brv w6bvm w6bxw w6efs w6egh w6yxx  
w7wfx w7hx w7ty w7wl w9adi w9aix w9bbw w9beu w9cfa  
w9bqh w9cax w9dwd w9ddq w9ddq w9ddq w9ddq w9eaj  
w9ebw w9eca w9fvw w9fyn w9gek w9gfa pylah pylaw  
py2ab py2ay py2na py2ba py2bk py2bm lu3de lu3dh  
lu6aj lu8dy celah x9a oa4j oa4s cxlaf cx2ak em2jm em2jt  
em2sh em2xd em2wa em5fc nj2pa on4dt on4fe on4gn on4je  
f8ol f8hs f8mrc ct1aa kfr6 kfr7 g2cj g2ma g2vq g5ml g5yg  
g6hp g6ut g6wt g6xb

**W4LY, E. R. McCarthy, 12 Forest Hill Drive,  
Asheville, N. C.**

ac1bd ac8ag an2lp ar2j celaa celah celwi ce2ab ce2ao  
ce3ac ce3bf ce3ch ce3ci ce3cr ce5aa ce7aa cebag clv cm1by  
cm2ay cm2jm cm2jt cm2sh cm2xa cm2xd cm5cx cm5fl  
cm5lu cm5ni cm8cx cm8dy cm8le cm8uf cm8yb cm8xr  
cm5a cm6d cm7f cm8a cm8z cm16 cm21 cm23 cm8mb  
cp1aa cr4ad cxlaf cxlfb cx2ab cx2ak cxewk cxlap  
cx7 ct1aa ct1ac ct1ae ct1bx ct1by ct1cw ct1db ct2aa ct2ac  
ct4ad d4aes d4ay d4rh d4xn ear10 ear21 ear41 ear65 ear96  
ear98 ear136 ear137 ear149 ear1 xearn eu2kbm f8aja f8aly  
f8awx f8aw f8bl f8et f8da f8dh f8dz f8ef f8er f8ex f8fa f8fo  
f8fk f8fr f8fbv f8fem f8gdb f8hr f8hw f8mrc f8pam f8px  
f8rm f8smi f8saw f8wrg f8ab cf8axo fm8cr fm8fz fm8fm  
fm8hi fm8mt f8prp f8shg f8qpm f8gf f8lmn f8ra f8z frk  
fub g2bm g2cj g2gm g2kf g2ma g2ap g5by g5bz g5dy g5jf  
g5ky g5ml g5mo g5ms g5qg g5rg g5uq g5yg g6bd g6nt  
g6fd g6rb g6rg g6vp g6wt g6xb g6xq g6za g6al hafic haf3e  
helenm hel1g hel1e hel2e hel2jm hel2jo hf3eh fn5 h5fx h1ha  
h77e hhy j2eb k4aan k4aef k4akv k4dk k4kl k4kf k4ni  
k4rf k6afd k6aff k6bla k6boe k6dd k6dmq k6dqf k6emb  
k6ep k6erh k6est k6fct k6aze k7anq k7hm k7jp kfr4 kfr5  
kdv5 kfu5 kfzt krnl kalaa kalca kalce kalcm kaldj kalhr  
lulba lules lu2aa lu2ar lu2ca lu2dj lu2fi lu3bf lu3de lu3dh  
lu3fa lu3he lu3oa lu3pa lu4ai lu4da lu4de lu4dq lu4bi lu4hj  
lu5ac lu5hi lu6ag lu6aj lu6fc lu6se lu7ei lu7je lu7jt lu8de  
lu8dj lu8dt lu8dy lu8se lu9ce lu9de lu9dt nj2pa n8mrc  
n8lnie oa4a oa4e oa4j oa4l oa4oa oa4p oa4q oa4r oa4soa oa4s  
ob3na on4aa on4au on4ca on4dj on4dv on4eu on4fe on4fm  
on4fp on4ft on4gn on4gw on4hp on4hj on4nm on4ox on4pj  
on4ro on4uj on4us on4w on4xx xoz7aw pa0qf pa0xg pa0zf  
pa9aj pk1aj pk2aj pk3bm pk3bo pjld pm6a py1aa pylah  
py1al py1aw py1bh py1ca py1ed py1l py1m py1r py1eg  
py1id py1im py2ak py2al py2ay py2ba py2bf py2bj py2bk  
py2bk py2ek py2ga py2ie py2if py2ig py2ih py2ii py2ik  
py3aw py3aq py3bf py3dh py7ak py8ma py2qb py2rd qq1a  
r4v rxc sm5yf splaa st2a su8rs x5ms ti2ea ti2hv velap  
velas velba velbd velbr velca velce velde veldq veldr  
velae velai velar velat velba velbb velbd velbe velbq  
velbu velbx velcd velck veldq veldw velde velce velfk  
velfp velfx velgd velgg velgh velhk velhu velhy velie  
velkl vel4po vel4rk vel4uy vel4xb vel4al vel4ao vel4aw vel5bl  
vel5bh vel5ef vel5ep vel9bj vel9ce vel9j vk2an vk2ax vk2eb  
vk2ch vk2es vk2dy vk2ek vk2go vk2hb vk2he vk2hl vk2jj  
vk2kj vk2kk vk2lj vk2lv vk2nb vk2nc vk2ne vk2ot vk2pk  
vk2re vk2rx vk2su vk2wk vk2wp vk2wu vk3ag vk3cm  
vk3ex vk3dp vk3dy vk3dx vk3go vk3hk vk3h vk3jo vk3ml  
vk3pa vk3pb vk3pm vk3pp vk3w vk3xx vk3zo vk3ak vk3zx  
vk4bh vk4fj vk4ga vk4mf vk4rj vk4ok vk4uk vk4vk vk4zx  
vk4xy vk5bj vk5by vk5gr vk5hg vk5it vk5ja vk5wh vk5wr

vk6fl vk6nk vk6sa vk6wr vk6mu vk7dx vk7dh vk7rb  
vo8ae vo8an vo8aw vo8me vo8xx vq2pa ve2ab vs6ah vs7al  
vs7ap vs7gj vu2ax via vjp vya wdde wfa wfat wfbt xc xaf  
xda xoq x8etb x3a x5a x9a c9b x9d xu2uu ynlv ys1ap ys1x  
ys1xb zllag zllan zllao zllfa zllfm zllfu zllfw zllfx zllfy  
zl2ab zl2ax zl2an zl2ac zl2bg zl2bx zl2bz zl2gh zl2gx zl2xc  
zl3af zl3ai zl3aj zl3as zl3cm zl3ab zl4ap zl4ax zslp za2a  
za4m za6d za5u stj atlr au6d zu6n zu8k zlv 10 meters (some  
are probably harmonics) wlada wlaz w1ax w4al w4hj w4nj  
w4te w4gw w5aot w6am w6dam w6bax w8ddk kfu5 glke  
ce2ab ct8r hjo w4mi

**W9ANQ, A. Herrmann, Jr., 653 Mill Ct., Wau-  
kegan, Ill.**

7000-ke. band

cm5fc cm5fl cm8yb k4kd k6bxw k6eqm k6erh k6oa hel1g  
nj2pa nn1nic ve2ca ve4ce ve4cu ve5er ti2rs yalx cab cabl  
kfr6 obe

14,000-ke. band

celah ce2ab ce5aa cm2jm cm2sh cm2xx cm5ex cm8uf  
cm8yb cx2ak g2bm g2gf g5bj g5bz g5hp gi5hv hel1g hel2je  
hel2jm k4akv k4kl k6erh lu9dt oa4e oa4j oa4l oa4q oa4t  
oa4s oa4fp py1ah py1aw py1id py2ax velam veldq ve2ac  
ve2ay ve4ai ve4be ve4bq ve4ha ve4he ve4ie vk2hb vk2wj  
vk2zk vk3ex vk3de vk3hm vk3jk vk3lp vk3ok vk5gr x9a  
ys1ap ys1x zllao zllas zllfr zllfw zl2bx zl3cm zl4bo kfu5

**VE5AL, King Cavalky, 4868 Blenheim St., Van-  
couver, B. C., Canada**

14,000-ke. band

velcw veldm ve2ac ve2ai ve2be ve2bh ve2ca ve3af ve3ak  
ve3aq ve3bm ve3bq ve3ce ve3et apl celac ce2ab ce3ab  
ce3bf cm2sh ct1aa f8fk f8da f8fx f8fj f8pa f8ax g2aj g5by  
g5ml g5ux g6bq he2om k6ets lu3de lu3dh lu8en lu9dt oa4d  
oa4h oa4o oa4p oa4q on4ar on4he pylax py1ah py2qa celah  
ti2hv vk2he vk2jw vk3ax x5a x9a xkt8ru zl2be

7000-ke. band

w1adw w1bkf w1mk w1om w2afr w2alu w2ahi w2api w2acd  
w2aql w2bud w2box w2ce w2ef w2fc w2goc w2se w2up w2sg  
w3aix w3ahv w3ekl w3cxl w3eb w3gt w3ys w4aik w4afs  
w4ags w4et w4ew w4paa w4lp w4gn w4rp w4rm w4rs w4ty  
w4vk w5aea w5aqe w5aav w5afx w5agp w5auu w5bbe w5bcb  
w5bek w5bbv w5bh w5bex w5la w5lr w5pe w5pp w5rj w5rv  
w5rq w5ql w5rg w5qx w5td w8ap w8av w8aq w8ayg w8amb  
w8bdl w8bcq w8bt w8bej w8buq w8bhc w8cqr w8cft w8cp  
w8ti w8yg w9ara w9ags w9afn w9buq w9bxc w9bkr w9bir w9bes  
w9bwt w9bze w9cwn w9eas w9ebd w9els w9lk w9un ve2be  
be2bh ve3bm ve3calkh kaljd k6avl k6axw k6bhl k6bra  
k6bxw k6cjs k6ceu k6de k6dm k6dmq k6eqm k6ero vk1ax  
vk2eh vk2hk vk2he vk2hw vk2jo vk2jx vk2ja vk2jw vk2kl  
vk2kj vk2ku vk2no vk2oj vk2wu vk3ac vk3ax vk3bk vk3go  
vk3ja vk3jk vk3jo vk3mx vk3tm vk3rk vk3bh vk4do vk4kr  
vk5dx vk5hd vk5gk vk5kj vk5mm vk5it vk5wr vk6nk  
vk7ch vk7ka vk6wm zllaa zllbb zllbi zllf zllt zllab  
zl2be zl2bi zl2bz zl2gk zl2gn zl3am zl3ae zl3as zl3ab zl3aw  
zl3cm zl3vf zl4ao zl4bg ac5eli celah c8tj cm2yb hel1g jldv  
j1xa lu2t rx1aa xclah xw2 kh1dv sien wfat wbsb

**VK3CX, Alan G. Brown, 8 Mangarra Road, Can-  
terbury, E. 7, Victoria, Australia**

14,000-ke. band

w1ala w1apq w1aqt w1aze w1bhm w1bux w1cmx w1cow  
w1lii w1za w2adp w2ajp w2alo w2ano w2api w2atk w2ayj  
(Continued on page 58)



# Correspondence

The Publishers of QST assume no responsibility for statements made herein by correspondents.



## Washington Licenses

FEDERAL RADIO COMMISSION  
WASHINGTON, D. C.

September 22, 1930.

My dear Mr. Maxim:

As you know, the Radio Act of 1927 makes the Federal Radio Commission responsible for the issue of radio licenses, including those of amateurs. Early in the existence of the Federal Radio Commission the duty of administering licenses to amateurs was delegated to the Radio Division, Department of Commerce, for reasons that existed at that time.

Since the Federal Radio Commission has now been provided with adequate facilities as regards office space and personnel, there is no longer any reason why the provisions of the Act should not be carried out by the Commission. Steps have been taken this day by the Commission to bring this about. A copy of the order is inclosed. [See article, "Changes in Regulations," in this issue. — Ed.]

As you know, the Commission has always been interested in the amateurs of the country and appreciates the good work which has been done by them. The Commission desires that all matters connected with the administration of amateur licenses be carried on in the most efficient and satisfactory manner. Any suggestions from you as to improving the procedure in the issue of amateur licenses will be gladly received by the Commission.

Yours very truly,  
C. McK. SALTZMAN,  
Chairman.

## VOQH

East Greenland Expedition for Museum  
of American Indian Heye Foundation

Editor, QST:

You have no idea what a source of comfort and relief it was to have the amateur radio men and girls in America and Europe come to our call, taking our messages back and forth to loved ones. After all, they are the ones who appreciate it more. We wish it could be possible to give all the amateurs a trip to the land of polar bears, musk oxen, icebergs and continuous days. The only thing we can do however is send our warmest thanks and best wishes to all the amateurs.

— R. A. Bartlett

## Technical Articles

Worcester C. P., South Africa

Editor, QST:

Relative to your editorial in the August number, it is strange that out here with our S.A.R.R.L. effort the editor is asked why he does not furnish more technical articles. The reply is that our magazine "QTC" is more or less of a family magazine and too — technical articles are out of place; while we all get QST, or should.

And so while we sympathize with the complainants we hope that with your resources you will continue your present policy in the matter of technical articles.

More power to your elbow.

— S. H. Walters, ZU1D

## Lids or Beginners?

Thomasville, Ga.

Editor, QST:

A short time ago I became interested in radio. To be exact I put my first transmitter on the air in 1910, just twenty years ago, not long enough for me to forget that I was not born with my knowledge of radio. I have always believed in listening to the other fellow instead of doing the talking myself.

I have been reading QST some ten years and this is my first letter. The reason for this epistle is the letter from A. D. Middleton, WSUC and WSAKA, in the October issue — page 56.

Every man has a right to his opinion. The fact that it does not conform with our own does not alter that right. I wish to take issue with WSUC on the last part of his letter, wherein he refers to the numbers of "lids" on the air to-day.

From my observation there is a greater interest in amateur radio to-day than at any other time since the little unpleasantness across the pond. This increased interest has given us an unusual number of beginners. These beginners are the only material from which to make the amateur and commercial operators to pound the brass when our ears are dulled and our fists will no longer separate the dots and dashes.

I may be mistaken, but I think most of this interference in our bands comes from the beginners, caused not through malice but ignorance. Brother, don't call them "lids" until you know they are. Look up their records. If they have "been on" a sufficient length of time to know





# Why Not Go Round the World . . .

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**RADIO**  
Pay Your  
Way

**RADIO** needs more men like you today . . . positions now open for "radio fans," who want to get somewhere in radio . . . men who think radio . . . who are radio minded . . . men who play and work at radio. Why not use the knowledge you already have as a stepping stone to success in radio? All you need is the practical up-to-the-minute training that RCA gives you. RCA Institutes actually trains you for success in radio . . . you learn under the direction of RCA experts. You get the practical as well as the theoretical knowledge . . . the "how" as well as the "why" of radio. You, too, can make good in radio . . . so, why not start today!

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Baltimore, Md. . . 1215 N. Charles St.  
Newark, N. J. . . 560 Broad St.  
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.....

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Use them in every socket and be certain of results.

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Chicago  
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better than they are "lids" and I have no sympathy for them.

In all my career I have never been too learned or too busy to explain in understandable language anything that a beginner asked, even though he could not converse in terms higher than "two turns on a two-inch coil."

Here is my conception of a drive against the "lids." Make contact with him; find out whether he is a beginner or a "lid." If the first, tell him what is right and wrong — if necessary write him a letter. If he proves to be a genuine "lid" tell him where to get off. If he persists in malpractice advertise him to other hams. Nature will take its course.

Amateur radio has been my greatest hobby, commercial operating my vocation and taking sides with the beginner my greatest weakness and pleasure. I never expect my name to blaze on memorial tablets for great achievements, but if when it appears in *QST* under "Silent Keys" some ham says "Bless his memory, he helped me over some rough spots," then I will stand by in peace.

Yours for better conditions.

— Ellis E. McBride, W4KX

## Tolerance

Tallahassee, Fla.

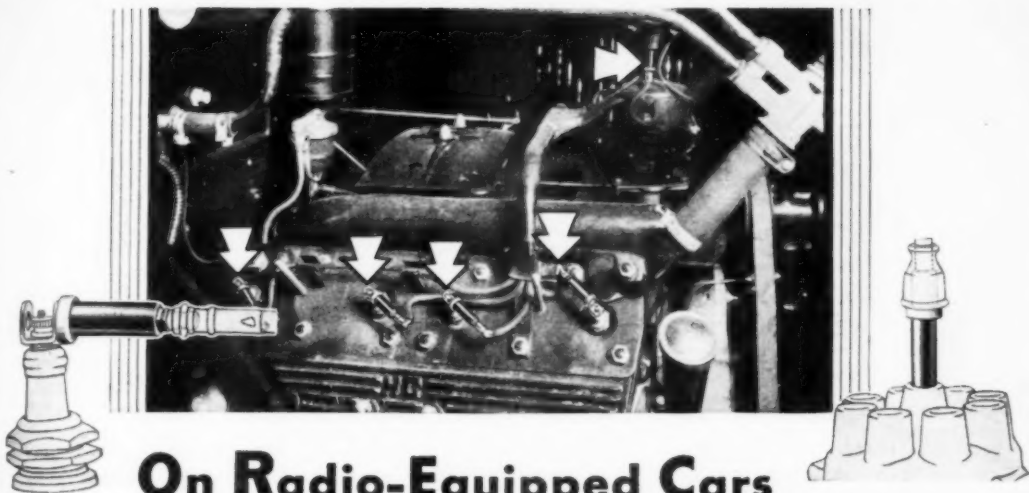
Editor, *QST*:

It was with much amusement that I read the letter by Mr. A. D. Middleton in the Correspondence Section of October *QST*. He seems to have a grievance against the world in general, and against the poor hams in particular. Of course, we all cannot sop up *all* the dope that is published in *QST*, while it seems that WSUC thinks that is the main requirement.

I must admit that I agree with him in reference to these birds who sit on their keys and forget to get up. But if he has never served in any branch of the commercial racket or the Government radio business, he has never heard any QRM. I served on board the U.S.S. *North Dakota*, and when we were stationed in Cuba or down around South America, the Old Man didn't take the QRM as an excuse for not getting N.A.A.'s press schedule every night. Many days we had to stand watch with lightning pounding down in the sea all around us. QRM? QRN? You ain't heard nothin'.

As to a man sending hash — what does this amateur game amount to anyway? I am new in the ham game, only having been on the air since last June, but I will say that all my QSO's were with fine fellows, and while our topics of discussion were only things concerning WX or radio or something on that order, I cannot consider that as hash. I am just as proud of those QSO's as if I were still serving Uncle Sam and all were important messages. I am in this game for the fun that I can get out of it, and while there is no excuse for a man holding down his key any longer than necessary, I believe it is all in the game.

Here's hoping that WSUC-WSAKA gets a



## On Radio-Equipped Cars

### Stop Interference by Installing Bradley Suppressors

**B**RADLEY Suppressors are special solid molded resistors, now used by prominent car manufacturers to provide individual resistors for each spark plug and for the common cable to the distributor on radio-equipped cars.

They increase the resistance of the high tension ignition system and minimize the disturbing oscillations in the ignition circuit which interfere with the radio receiver in the car. When used with suitable bypass condensers in other parts of the circuit, shielded ignition cables are unnecessary.

They do not affect the operation of the motor. The sturdy construction of Bradley Suppressors adapts them for the severe service in which they are used. Heat and moisture and age have no effect upon their performance. Their design is the result of more than a quarter century of experience in the manufacture of solid molded resistors. They are the last word for motor car radio.

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By JAMES A. MOYER

Director of University Extension, Massachusetts  
Department of Education

and JOHN F. WOSTREL

Instructor in Radio Division of University Extension,  
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different view on life, and that he will answer a few of these long CQ's and work the man to the bitter end.

— S. M. Douglas, W4ACB

## Suggestions

1928 Lewis Ave.,  
Long Beach, Calif.

Editor, QST:

I would like to offer a couple of suggestions for improvements in operating practice. Both ideas have been used at W6DZK for several years, and they work well — when the other operator understands them.

The first is this: Why not, at the end of each CQ, sign TOP, or BTM, indicating at which end of the band you intend to start listening. Thus, if the other operator hears you sign BTM, and his wave is near the bottom, then he knows that he need only give you a short call.

The second suggestion is merely to alternate the end of the band at which you start listening. This practice would probably eliminate such statements as: "I can't raise him; he always starts listening at the top of the band and my wave is at the bottom," etc. A good station nearly always hears one or more answers to calls before covering the width of the band.

Possibly these ideas have been submitted before, but I failed to notice them. At any rate, please take them for what they are worth.

— Orin C. Lewis, W6DZK

The suggestion is a good one but may lead to confusion unless we define the "top" and "bottom" of a band. In spite of QST's many adjurations to hams to think in terms of kilocycles instead of meters, there are many to whom the high-frequency end of a band is the "bottom" and not the "top." Maybe some sort of system using the words "high" and "low" instead of "top" and "btm" would overcome this — or better yet "hf" and "lf." — Editor.

## Commercial Operating

M.S. Pacific Sun

Editor, QST:

As to your query, "Do tankers have port holes," I am taking the liberty of presenting my views on commercial operating in verification of as well as in contradiction to the letter from Mr. M. R. Rathbone.

I have followed the sea as a commercial operator for over five years and have been on passenger ships, freighters and tankers. I feel that I am in a position to give an unbiased view of living conditions as well as of the moral association into which the average commercial operator is thrown.

I have at no time ashore found men so willing to be of assistance, men so willing to go out of their way to do you a favor as the larger percentage of seagoing mates and engineers. I have found them at all times willing to give a hand to the man who comes on board a vessel to assume his duties as radio operator for the first time. Mr. Rathbone has assumed a most unfair as well as

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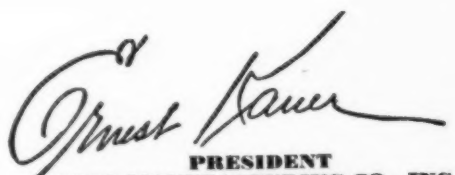
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QST 12-30

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 (PRINT)

narrow view with regard to the official personnel of our American Merchant Marine, and I am sure that he has had time to regret his statement. As for the education of the present mate or engineer, has Mr. Rathbone taken into consideration the three or more years he has had to work and study to be able to procure his license? Not in a nicely lighted and heated college but in a school of hard knocks, in a battle with the elements wind, sea, heat and cold as well as a necessary course of study. Is not that in itself a liberal education?

As for the morals of our Merchant Marine as a whole, I think they are above reproach. Did Mr. Rathbone stop to consider the position into which the average sea-going man is thrown? If he had, I believe he would have been more lenient with his condemnation. I have at no time found men more respectful and solicitous of the companionship of a good woman than a sailor. To prove my statement, take the YL's on any merchant vessel and see for yourself the courteous treatment which they will receive. I doubt if it can be surpassed by any body of men ashore.

As for the actual living conditions, I heartily agree with Mr. Rathbone. Many operating berths are decidedly inadequate due to meagre accommodations and to their placement. Steamship companies lose hundreds of dollars each year because of the continual change of operators on these undesirable vessels. It would be well if the owners would take the interests of the operator to heart when designing the radio room and his living quarters. The meals on board vessels of the American Merchant Marine vary in accordance with the allowance per day per man but more so with the ability and knowledge of the steward's department on each vessel. On passenger ships meals vary mostly with the size and run of the vessel and quite a variety of edibles can be expected which should be more than satisfactory to suit the most fastidious operator.

As for the romantic and adventurous side of operating, Mr. Rathbone seems to be something of a cynic. After five years of operating, I find I still enjoy a visit to a foreign port or a trip up the Mississippi. From an educational point of view, I believe a trip to Europe, the museums and art galleries of Brussels, Amsterdam, Antwerp and many others too numerous to mention will more than repay the average operator for the time expended in procuring his ticket.

At the present writing, there is more than a surplus of operators and any berth is not to be overlooked. Runs cannot be picked at random and the new operator should not be discouraged if his first ship contains all the disadvantages that can be expected from an operating standpoint.

— L. E. Littlejohn, Ex-5NE, WQDL

## Some Heavy Traffic

75 New Haven Ave.,  
 Milford, Conn.

Editor, QST:

I am writing this as an open letter of appreciation to those stations on 3.5 mc. who helped

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*A Handbook for Students, Amateurs, Operators and Inspectors*

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### Prepared by Official Examining Officer

The author, G. E. Sterling, is Radio Inspector and Examining Officer, Radio Division, U. S. Dept. of Commerce. The book has been edited in detail by Robert S. Kruse, for five years Technical Editor of QST, the Magazine of the American Radio Relay League, now Radio Consultant. Many other experts assisted them.

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# QST Can Help You With Your Christmas List

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☐ A yearly subscription costs only \$2.50, little enough for the ones you have in mind. And — we'll send an appropriate gift-card conveying your Christmas Greetings.

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QST

1711 Park St., Hartford, Conn.

Please send *QST* to the following, find my check enclosed, and send out the Greeting cards for me.

1. ....  
.....
2. ....  
.....
3. ....  
.....

me so splendidly in a recent bit of traffic handling.

With no schedules being prearranged, I took 170 messages from the Philadelphia Radio Show, where W3IC, W3IA, W3AW and W3AKY were operating W3ATC at the U. S. Naval Reserve Booth. The fine operating of these fellows enabled me to receive the traffic without any trouble. It was just another one of the "long shots" and I had my doubts as to whether I would be able to clear the hook. However, as the log here shows, the next twelve stations worked each took a fair sized slice of these messages, so that all traffic was cleared within twenty-six hours after the last one had been received from W3ATC. With several of these stations, schedules were made for different hours of the day in order to route the traffic as fast as it was received.

The following stations have my sincere thanks for their splendid coöperation: W1CNE, W1WU, W1WV, W2CIA, W3AMH, W8BDG, W8CHC, W2CGO, and W8CPE. To W8CHC, the deepest gratitude is extended for his wonderful help in taking from me 105 of these messages in the surprising time of 130 minutes. To fully appreciate this feat, you must realize that the check on these messages was close to 2400 words, with some very difficult combinations in a large number of the addresses.

In my opinion this shows in a measure the attitude of the general amateur toward traffic, and it makes a fellow feel great when everyone says "Sure QSP, MK GA." More power to you all and happy days.

— E. F. Scholz, W1AMQ

## Saving the Wrist

Iota, La.

Editor, *QST*:

This may be of interest to many hams, as the scientific wonder I will unfurl before them is a boon never dreamed of in this great amateur game. I have invented a machine for a great many of the amateur fraternity which will be known to them as the "CQ es CALL BLURRER." This machine is the wonder of wonders, and is designed to save certain hams from a "CQ wrist." A "CQ wrist" is one that cannot stop until thirty or forty are made and then the wrist is so tired that it is unable to make the sign, making only a slur.

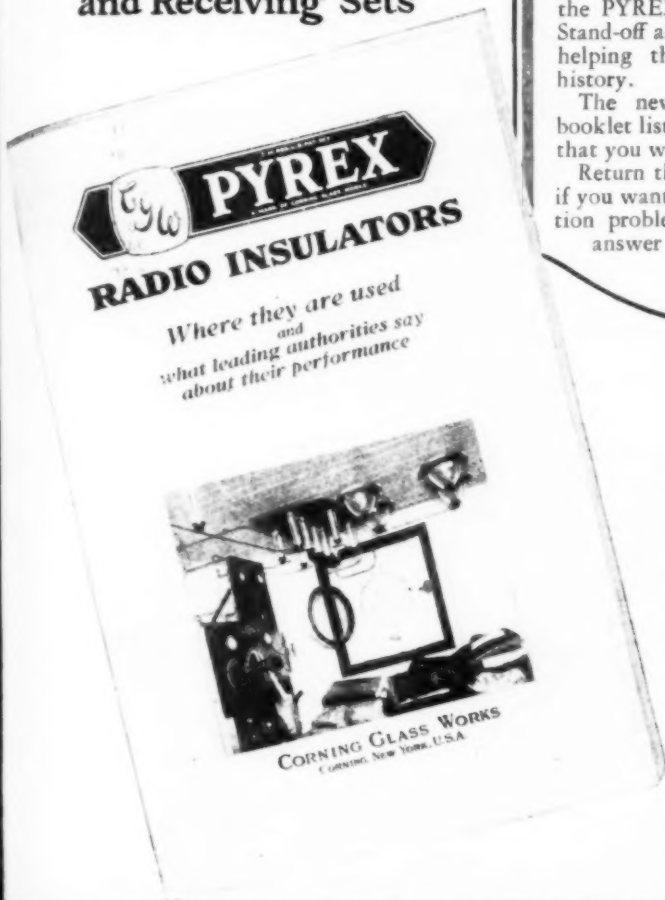
This machine has a minimum of thirty and a maximum of two hundred CQ's. Of course the setting most used is between thirty and forty before signing. The machine also makes your call, as the manufacturer puts that in when the machine is ordered.

It has one knob which controls the amount of CQ's to be emitted thereby enabling the ham to set it at the desired speed and amount of CQ'ing to be done. It also will make a clear sign three times or slur just once at the operator's pleasure.

Utopia at last has arrived for the terrible CQ hound and he can easily purchase one of these wonderful machines, direct from the manufacturer, "CQ es CALL BLURRER" Machine Co., Inc.,

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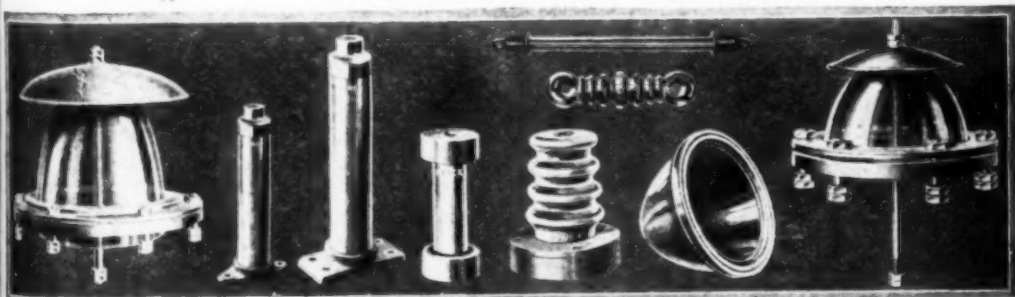
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Name

Address

QST 12-30



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of this city, for the modest amount of \$44.50, prepaid.

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— R. L. Tomps, W5MH

## Re: Traffic CQ's

Burlington, Wis.

Editor, QST:

We read with much interest the letter from Roy R. Wallace, W6ERU, in the September issue.

While W9EBO is not purely a traffic station, we have handled as many as three hundred messages in one month and are always glad to QSP any time to any place.

We too have tried directional CQ's without much luck, so as an outcome of this experience are much in favor of the set of CQ signals as outlined by W6ERU, as we firmly believe that this system would do away with a lot of needless QRM by letting the other fellow know just what is wanted by our CQ.

A practice which we have always used here is to never answer the ham who sends his CQ 15 or 20 times and then signs. There is ONLY ONE RIGHT WAY to do anything and if any ham cannot send his CQ in the proper way, he is merely admitting to the rest of the gang that his station is poorly operated.

We are with you, W6ERU. Constructive criticism is always welcome — let's hear from more of the gang.

— M. F. Whitton, W9EBO

## Getting S. F. Transmissions

Dexter, Mich.

Editor, QST:

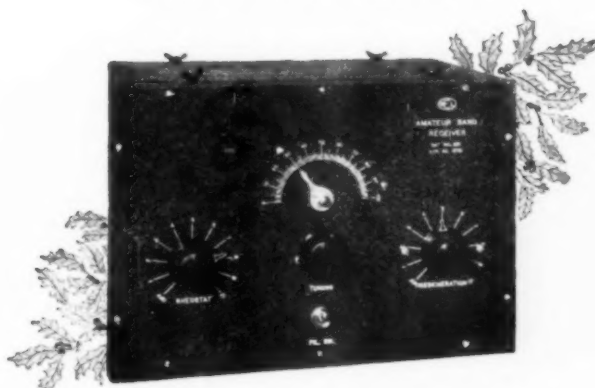
It is common practice when listening to the Standard Frequency transmissions to tune the receiver to zero beat with the incoming signals and then tune the frequency meter to be calibrated to zero beat with the receiver and the S.F.S. at the same time. While this practice is OK and very accurate, I have a much more convenient method.

If the frequency meter is of the heterodyne type, tune the receiver to the incoming signal in the usual manner, then back just off the point of oscillation and no beat note will be heard. Now tune the meter to beat with the incoming signal and the audio beat note will be heard in the "cans." Tune to zero beat, and you have the meter in step with the transmitting station and don't have to worry about the receiver. After tuning in the signal with the frequency meter it will be found that the tuning on the receiver is rather broad and the beat note of the same audio pitch regardless of receiver adjustment.

Sometimes it will be an advantage to use the frequency meter in this way to bring in a weak signal when working skeds, and BOY! that's



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copies as a unit

A few years from now QST copies of to-day no doubt will be scarce. Every reader of QST appreciates its reference value. We are daily reminded of this fact by the many requests we get for back copies, many of which we cannot supply. If you have the 1920 series of QST — and probably you have not — you are one of the few. Even 1922 and 1923 copies are getting scarce. And copies before the war! Well, let's change the subject.

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**QST**  
1711 Park St., Hartford, Conn.

where the scheme shines: Tune approximately with the receiver out of oscillation and do the rest with the frequency meter. If the incoming sig is steady you will get a beautiful beat note and practically eliminate background noise due to local QRN from loose wiring systems and vacuum cleaner motors.

In this way the frequency meter serves not only as a standard of measurement but as a separate heterodyne oscillator.

— R. O. Williams, W8AJC

## I.A.R.U. News

(Continued from page 50)

in view of the fact that several new stations have been authorized to operate in the band between 200 and 250 meters.

Moreover, complaints of interference with B.C.L. sets from amateur operation will in future be investigated by the Dept. with the assistance of an officer of the W.I.A. This latter concession has been made possible by the fact that the Institute has definitely proved that it is able to effectively control the operations of its members by virtue of their loyalty to the movement.

The 1715- to 2000-kc. band is used mainly for experimental broadcast experiments, and there are more stations operating in Victoria than in any of the other divisions, for some reason or other. In this state there are about 20 stations operating, and some sort of wavelength allocation has become necessary. Stations are allotted wavelengths from the top of the band down, with 20-kc. separation between allocations. The scheme works out very well, but has occasionally been upset by a stray non-member station coming in and heterodyning. No further trouble is ex-



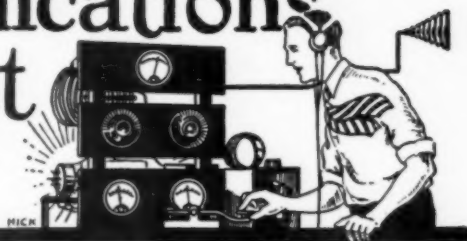
AU1AO, THE STATION OF V. SOLOMIN, SENNAJA  
57, BIISK, SIBERIA

pected from this source as the Dept. has in the public interest sanctioned our scheme and notified these "outside" stations that they are to observe our allocations. The Fed. Executive therefore has just cause to be proud of the result of the negotiations, and the faith which the Radio Dept.

(Continued on page 60)

# The Communications Department

F. E. Handy, Communications Manager  
E. L. Battay, Asst. Coms. Mgr.  
1711 Park St., Hartford, Conn.



## Watch Frequency!

**R**EMEMBER the complaints that followed amateur off-frequency operation on GBW's channel last Christmas and Thanksgiving Day? These followed haphazard 14-mc. amateur operation which took place holidays and week-ends. Such complaints can and must be prevented this season.

Already A.R.R.L. is in receipt of complaints of an increasing number of instances of interference, not only with GBW, 14,440 kc., but with GBS, 6905 kc. also. Just think of it, operation practically 100 kc. out of bounds and such operation on the increase as November advances. We must watch this to avoid sure trouble ahead. Long distance telephone calls from New York to Texas and Oregon amateurs and points all over the country are one means used by A. T. & T. to keep the transatlantic radiotelephone channel clear. Some individual "hams" have experienced "that most embarrassing moment" when a New York call came through to call them away from the key. But there is bound to be a more grievous moment if it becomes necessary to make examples, placing operator's licenses in jeopardy as the Radio Division singles out incompetents who show their unfitness by off-frequency operation. Take warning! On 14 mc. your transmitter may be capable of putting a terrific signal into the sensitive receiving station at Netcong, N. J., at the same time you are unable to pick up GBW due to skip effect.

Today we have improved frequency meters. There are weekly s.f. transmissions from W1XP, W9XAN and W6XK. Good amateurs make use of the information and facilities available, and use frequency meters regularly before going on the air and every time frequency is changed. Approximately one hundred A.R.R.L. Observers are requested to watch the situation closely and to make every effort to remedy conditions that arise by their prompt, friendly notifications to off-frequency stations. Radio Division monitoring stations are also active in each inspection district doing policing work on amateur as well as other frequencies.

Don't take chances this year. Measure frequency each time the station is placed in operation. The possible consequences to individuals caught out of bounds by the government are too great to be easily ignored!

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The location of the 7000-7300-kc. band is easily found — between XDA at about 7320 kc. and WIZ, 6965 kc.

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The government presupposes in issuing licenses that adequate equipment and intelligence will be employed by all service in keeping stations in the prescribed limits. There are "reasons" for frequency deviations usually, but no excuse.

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We got XDA moved. Which reminds us. We'd like to ask Official Observers to check and report all encroaching commercials, b, c harmonics, etc., noted in the amateur bands per their instructions in the R. & R. Kindly log stations two or three days or a week. Give specific frequencies and state the accuracy of measurement, please. Then Headquarters has something to work on in effecting relief through the proper channels.

QST FOR DECEMBER, 1930

## Expedition Notes

Many of the better known expeditions have completed their work for this year. The *Burdoin*, WDDE, returned in mid-September. VOQH, the *Morrissey*, is also back. From time to time we have received reports on various expeditions and at this time we would like to report the following brief sketches of amateur cooperation:

### WDDE

Operator Paul H. Davis, Jr., of W9ADU writes as follows: "I want to express my most sincere gratitude both to the A.R.R.L. and member-stations for the great assistance and cooperation which was accorded me this summer, in the handling of traffic from the schooner *Burdoin*, WDDE. The success of the radio end of the expedition I feel is largely due to the help which you gave me."

The following amateur stations handled most traffic for WDDE, the number of messages handled being indicated, W8DYH (19), G5BY (17), W9DYJ (10), W9BRX (7). In the list of "stations worked" which follows, those handling traffic and assisting the expedition materially in that manner are distinguished by asterisks:

W1AFA\*, W1PH\*, W1PE\*, W1AVJ, W1BDS, W2AVQ\*, W2AVS\*, W2AOX\*, W2HN\*, W2CCC\*, W2BJO\*, W2BQR\*, W2BV, W2BKA, W2AKY, W3ASE\*, W3SZ\*, W3AWS\*, W3BDO, W3AJH, W3LA, W3AOJ, W4ADT\*, W4AKT, W8BG7\*, W8DYH\*, W8KD\*, W8BUD\*, W8CFW\*, W8CLG\*, W8DQK, W9BRX\*, W9DYJ\*, W9GFZ, W9DKU, W9ADN, W9ABB, W9EAJ, W9BHM, VOQH\*, VE1CO\*, VE2BE, VE4FX, G5BY\*, G6WT\*, F8DOT, F8WHG, NAMS.

W2AVS worked WDDE on the 14-mc. band at 0000 G.M.T., August 24th. He took several messages addressed to the families of the crew. W3RD heard WDDE at W3ATJ at 8 p.m. E.S.T., August 25th. This was also on 14 mc. WDDE was using 14 mc. temporarily in order to be sure of clearing emergency traffic.

W1KH heard WDDE at 6:05 p.m., E.S.T., August 27th. W2BV was QSO WDDE, August 27th, at 5:30 p.m. E.S.T. WDDE'S QRA at that time was Mikkovik, Labrador. W1BFT regularly heard WDDE on 14 mc.

### VOQH

W1QB worked VOQH on 14 mc. at 4:30 p.m. E.S.T., August 22nd, and took one message from him. At that time, VOQH was located 50 miles north of Angmagssalik, near Eric the Red Island, at Itivdiersuah, S. E. Greenland, and was bound for Angmagssalik. His signals were QSA3, R5 at W1QB. W2AEY also worked VOQH. W1CTI heard VOQH QSO W2AIS on about 9750 kc. at 2:15 p.m. E.S.T., September 7th. The signals were QSA4 with slight wobble. W2ACD also heard the *Morrissey* at 2 p.m., September 7th, at that time working W3OZ. W8DME and W8ADM kept 14-mc. schedules with VOQH during part of the trip. W8ADM handled much press and rush traffic. W8AON handled a message from VOQH to W8DME. W2JN took several messages from the ship on September 15th. W1AFB heard the *Morrissey* working W1RP and W2QN on the afternoon of September 21st.

### DDOE

W1QB worked DDOE at 3 p.m. E.S.T. on June 22nd on the 14-mc. band. DDOE is the station of the *Dickey; Orinoco Expedition* last reported at Caicara, Venezuela. DDOE has a p.d.c. note on 15,000 and 8120 kc. and communication is requested with amateurs on the 14-mc. band.

## DAIV

DAIV, Count von Luckner's yacht *Mopelia*, arrived in New York the last of August. Operator Pascal worked a number of hams during his trip through the West Indies and we hope to have a detailed account of his work for a later issue of *QST*. Among those stations handling traffic from DAIV were WILZ, W3AWS and W1MK. Operator Parmenter of W1MK is to receive the cup offered by Count Luckner to the amateur radio operator who gave the best service in providing communication with the yacht. This cup is to be presented to "RP" upon the Count's return from a trip to Germany.

Amateurs who heard or worked DAIV, during its two months cruise through the West Indies may QSL to the operator, Jacques Pascal, W2CEV, 85 Sherman Avenue, Staten Island, New York. W2CEV states that a card awaits all those who QSL.

## O-2XD

A field radio station was established upon Niufou Island by the *Naval Eclipse Expedition* headed by Commander Keppler. The call letters are O-2XD and the operators at Corporal Stillwell, U5ADP-NN7NIC-NAZ, and Corporal Pederson, W6BUG-NPP, of the U. S. Marines. O-2XD operates on 2305 kc., and can receive up to 16,000 kc. Amateurs should watch for any opportunity to cooperate with O-2XD. Communication is ordinarily carried on through Samos, but the Expedition expects to intercept weather, press and other information as far distant as Washington.

## WFA

The following is quoted from a letter received at Headquarters from Operator Petersen of the Byrd Expedition and will be of interest to all who worked WFA or other Byrd installations:

"I herewith take the opportunity to express my thanks to you and all A.R.R.L. amateurs for their interest in our expedition and I hope in the near future to contact many of the amateurs I used to work from Little America and the expedition ships, as I probably will go on a couple long distance flights soon, and also on another expedition next year."

We also understand informally from Howard Mason that the many amateurs who worked WFA put over one of the best, if not the best piece of work amateurs have ever done. Messages handled through amateurs totalled nearly five hundred a month sent and received for some of the months at WFA. The traffic from Little America, Antarctica handled through amateurs, consisted largely of messages of a personal nature from the expeditioners to their families. Many of the amateur contacts were the most reliable, considering the distance, that have ever been made on high frequency. DX records were made, too, as the distance to Little America was nearly 9000 miles from the U. S. A. Many a 7½-watt station was contacted by WFA. Since the possible available working hours for WFA-WHD were frequently so limited that only press and expedition business could be cleared, WFA endeavored to keep and make as many contacts with amateur stations as possible, as the best (and only) way of clearing the quantities of traffic filed with the operators for transmission.

## TRAFFIC BRIEFS

For six consecutive months the Los Angeles section has had the highest traffic total in the country. Where are the other sections? Here is how the Los Angeles gang feels about leading so consistently (quoted from the September issue of the *Oscillator*): "Is there no Section or Division in the entire realm of Hamdom which has enough pep, ham spirit or what-have-you, to give the Los Angeles Section some real competition in traffic totals? We almost own the banner in *QST*, but we like to work for what we get, and while we still hope to win it, we welcome competition. What is the matter with the eastern half of this country?" Come on, fellows, make it more interesting for those energetic chaps out in L.A.

Among the new YL operators is a young lady down in "Jersey," who owns and operates station W2CMK. Miss Genevieve MacKeeby, the YL in question, is only fourteen years old (perhaps our youngest YL op.?). She may be heard using a Type '10 on the 3500-kc. band. To W2CDQ go the thanks for tutoring W2CMK.

While W6ESA was working CE1AH recently, W6ASM 'phoned to ask that CE1AH be turned over to him after W6ESA had finished. W6ESA told CE1AH to look for W6ASM. After the first call W6ASM's receiver went dead so he again 'phoned W6ESA to ask for help. W6ESA tuned in CE1AH and held the 'phones to the telephone. W6ASM could read CE1AH perfectly via W6ESA and the telephone lines, and a thirty-minute QSO ensued. FB, OMs.

## BEGINNERS, ATTENTION!

The following additions have been made to the list of Volunteer Stations that send code practise on the 1750 kc. amateur band, which appeared in the November issue.

W2CDQ, Ho-Ho-Kus, N.J., (1720 kc.) Daily except Friday, 8:30-9 p.m. E.S.T.

W2GL, Valley Stream, L. I. (1765 kc.) Fridays 10:30 p.m. E.S.T.

W6BUZ, Reedley, Calif., (1715 kc.) Tues., Thurs., 9 p.m. P.S.T.

WSBYD, Jamestown, N.Y. (1800 kc.) Mon., Wed. 7:15-7:45 p.m. E.S.T.

W8DNT, Rochester, Mich. (1875 kc.) Mon., Wed., Fri. 7:30-8:30 p.m. E.S.T.

W9DDV, Chester, Ill. (1730 kc.) Mon., Thurs. 7:30-9 p.m. C.S.T.

W9EPW, Geneseo, Ill. (1820 kc.) Tues., Thurs. 10:45 p.m. C.S.T.

If you receive the transmissions from any of the "volunteer stations," we suggest that you write to them and let them know how they are coming through and what help you are deriving from their efforts.

## W1MK

A.R.R.L. Headquarters' Station W1MK operates on frequencies of 3575 kc. and 7150 kc. Robert B. Parmenter, "RP," is the chief operator; his fist is familiar to most of the amateur fraternity. Occasionally other members of the Headquarters staff operate at W1MK. Their personal signs may be found in the QRA Section of *QST*.

Throughout the following schedules Eastern Standard Time will be used.

OFFICIAL AND SPECIAL BROADCASTS are sent simultaneously on 3575 kc. and 7150 kc. at the following times:

8:00 p.m.: Sun, Mon., Tues., Thurs., and Fri.

10:00 p.m.: Mon. and Fri.

12:00 p.m. (midnight): Sun., Tues., and Thurs.

GENERAL OPERATION periods have been arranged to allow everyone a chance to communicate with A.R.R.L. Headquarters. These general periods have been arranged so that they usually follow an official broadcast. They are listed under the two headings of 3500 kc. and 7000 kc. to indicate whether the watch is devoted to listening on the 80-meter band or to the 40-meter band.

3500 kc.

8:10 p.m. to 9:00 p.m. on Sun., Mon., Tues., Thurs., and Fri.

10:00 p.m. to 11:00 p.m. on Tues. and Thurs. (No. OBC sent before these periods.)

12:00 p.m. to 1:00 a.m. (or later) on Sunday night (Monday morning).

7000 kc.

10:00 p.m. to 11:00 p.m. on Sun., Mon., and Fri.

12:00 p.m. to 1:00 a.m. on the following nights (actually on the morning of the day following): Mon., Tues., Thurs., and Fri. (Only on Tues. and Thurs. does the OBC precede these periods.)

SCHEDULES are kept with the following stations through any of which traffic will travel expeditiously to A.R.R.L. Headquarters, on 3500 kc.: W1ACH, W1BXB, W1CTI, W1WZ, W2JF, W3AVI, W3BWT, W3CXM, W8CKC, W8CUG, W8DLG, W9OX; on 7000 kc.: W4AGR, W6OJ and W9ECS.

QSL CARDS for W1MK should be addressed in care of A.R.R.L., 1711 Park Street, Hartford, Conn. A complete log of every transmission is made and W1MK is always glad to send any station worked a card, but frequently cards are lost when sent direct to the station at Brainerd Field. W1MK always QSLs upon receipt of card from station worked.



## Traffic Summaries

(SEPTEMBER-OCTOBER)

Pacific led by Los Angeles	10127
Atlantic led by Eastern Pennsylvania	8995
Central led by Michigan	6847
New England led by Eastern Massachusetts	4163
West Gulf led by Oklahoma	2040
Midwest led by Missouri	1670
Hudson led by Eastern New York	1472
Roanoke led by Virginia	1350
Northwestern led by Oregon	794
Dakota led by Southern Minnesota	780
Rocky Mountain led by Colorado	508
Delta led by Louisiana	370
Vanalta led by British Columbia	205
Ontario	203
Southeastern led by Alabama	163
Quebec	131
Prairie led by Saskatchewan	55
676 stations originated 12,166; delivered 6327; relayed 21,380; total 39,873 (52%).	



Los Angeles came very near defeat this month. Eastern Pennsylvania came through with a total of 5653, close behind Los Angeles' 5974. Watch your step, L. A.

A traffic summary showing the standing of the various divisions for the past month is printed above. What place does yours take?

## Official Broadcasting Stations

CHANGES AND ADDITIONS  
(Local Standard Time)

WIATJ (3950 kc.) (cc), Daily, 6:30 p.m.
WIAUR (3980 kc.), Tues., Thurs., Sun., 6:00 p.m.
WICDX (3950 kc.), Tues., Thurs., Sat., 6:30 p.m.
W28C (3850 kc.), (cc), Mon., 8:30 p.m.
W41M (7009 kc.), (cc), Mon., Wed., Fri., 12:30 p.m.
W5TV (3980 kc.), Wed., Thurs., Fri., 8:00 p.m.
W7ALW (7064 kc.), (cc), Tues., 10:00 a.m.
W7ALW (3532 kc.), (cc), Fri., 8:00 p.m.
W7MQ (7080 kc.), Tues., Fri., 1:00 p.m.
W8CLN (3805 kc.), Daily, when possible, 8:00 p.m.

## Traffic Briefs

WIAFD recently received a communication from YI6KR at Sulaimania, Iraq, who says that most all U. S. signals come in FB there most of the time, but that YI signals fail to come east or west (whichever it is) to this country. YHCD, YI2GM, YI1LM and YI6HT report this same difficulty. This will be of interest to the DX hounds as Iraq has made many U. S. hams members of "WAC."

For several months we have not run the lists of Prehistoric Signals (broad, AC, ICW, etc.). The lists have continued to come in from the gang, but we have been hesitant to publish them as the stations represented in the lists are, under the new Federal Radio Commission rulings, regulation-violators. Constructive complaints made for betterment of amateur radio and as a move to increase enjoyment of our hobby are welcomed by Headquarters and are taken up direct with the operators concerned. This has been the procedure in the case of the "rotten signals" reports received during the past few months. We have been urged by a number of amateurs to again publish the lists in QST. The title "SELF-ISH-CITED SIGNALS" has been suggested as a suitable heading for the lists. Would you like to see a continuance of the old Prehistoric lists under this new title? If a suitable number express the wish that the lists be brought back, we shall again run them in QST. Whether or not they appear in QST, they are always welcomed at HQs and should be forwarded via the SCM.

It will be noticed that with this issue we are resuming the lists of High Quality Signals. All operators are invited to recommend lists of outstandingly good signals consistently heard. Send in your list to-day.

QST FOR DECEMBER, 1930

## BRASS POUNDER'S LEAGUE

Call	Orig.	Del.	Rel.	Total
W3BU	2350	—	—	2350
W3ATC	1578	19	67	1664
W6AHP	1360	10	70	1440
W3CXL	43	97	990	1130
W6EGH	3	17	866	886
W9DZM	324	426	102	852
W8DYH	42	45	714	801
KA1HR	224	223	346	793
W6QP	112	119	470	701
W5VQ	38	72	526	636
W6AOA	45	9	552	606
W6BIP	72	36	484	592
W5AII	9	22	458	489
W6YU	12	58	417	487
W3UH	41	36	407	484
W3CXM	41	61	346	448
W1AMQ	6	22	417	445
W3BWT	130	74	232	436
W1MK	123	61	238	422
W1ACH	355*	22	44	401
W8CAT	10	39	317	366
W1WV	30	87	237	354
W8BGX	8	29	273	310
W8CUG	131	14	155	300
W6CNC	235	6	6	294
W8DLG	2	19	241	262
W6ALX	63	51	128	242
W8DED	50	12	180	242
W3MC	3	12	222	237
W3ZE	43	41	149	233
W1BXC	19	53	154	226
W6EKE	13	16	194	223
W9BMA	22	73	122	217
W6ETJ	41	60	116	217
W9GAR	28	1	186	215
W6YG	97	20	96	213
W8DMS	16	22	172	210
W7ZD	27	126	54	207
W1IP	7	9	186	202
W6BIR	7	56	138	201
W9MI	22	51	112	185
W4AA-W4NG	48	53	76	177
W9COS	48	114	6	168
OMITH	87	76	—	163
W9DRG	40	109	8	157
W8QL	30	110	15	155
W6AGR	41	72	32	145
K6CDD	46	59	26	131
W6OJ	44	62	23	129
W2SC	29	52	44	125
W2BIV	5	110	8	123
W9GFL	15	54	37	106
W6CWT	22	52	24	98
W6EKC	20	53	14	87
W5BAM	10	50	8	68
W2BC	—	55	5	60

All these stations appearing in the Brass Pounders' League are noted for their consistent schedule-keeping and dependable message-handling work in amateur radio. Special credit should be given to the following stations in the order listed responsible for over one hundred deliveries in the message month: W9DZM, KA1HR, W7ZD, W6QP, W9COS, W8QL, W2BIV, W9DRG.

Deliveries count! A total of 200 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 50 or more deliveries will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify you for B.P.L. membership also?

## AN OFF-FREQUENCY COMPLAINT

The following is quoted from a letter received at HQs recently from Robert Aldrich, W2BTL, President, Flyers Incorporated:

"Being located at the Albany Airport and within a half mile of Airway Radio Station WWAH I have occasion to listen on the 6000-ke. (50-meter) band for Airway traffic relative to weather, etc. This 6000-ke. band is the daylight working frequency of all Airway stations.

"Several times while copying in this band I have heard some of our noble 'off-frequency' brothers calling CQ, and 'what not.' While, of course, any out-of-band operation is decidedly serious this sort of 'slopping over' seems to me to be nothing but plain suicide. This Airways Radio operation is serious business and, believe me, the United States Government takes it as such. When any amateur can become so sloppy that his frequency starts wandering around in the 6000-ke. band (this is 1000-ke. from the nearest amateur band — ELB) it is time to call a halt."

We are getting mighty far afield, fellows, when we are logged on 6000-ke.!! It must stop at once or serious trouble is ahead. Check up on your frequency before each transmission so that you will know where you stand!



## High Quality Signals

3500-ke. band: W1AIC, W1AJB\*, W1AJD, W1AKY, W1AMQ\*\*, W1APK, W1BD, W1BJD, W1BOD\*, W1BU, W1BXB\*, W1BYM, W1CGX\*, W1HI, W1KR, W1MK\*\*\*\*, W1TL\*, W1ZA, W2AG\*, W2AEP, W2AOS, W2BRF, W2BRH, W2CWX\*, W2CXL\*\*, W2EV, W2JF, W2PF, W2SC, W2TT\*, W3AAV, W3ACM, W3AJL, W3AQR\*\*, W3ARU\*, W3ASW, W3ATN, W3BF\*, W3BQF, W3CGS, W3CJN, W3CXM\*\*, W3DH, W3FY, W3GS, W3OZ, W3QV\*\*, W3VM, W4AJL, W4JR, W4LL, W4OC\*, W4PM, W7ACY, W7AHR, W8ABQ, W8ADS\*, W8AGO, W8AIO, W8AJC\*\*, W8AKD\*, W8AKV\*, W8APO, W8APQ\*\*, W8ARX\*\*, W8AYF\*, W8AYJ\*, W8AYU, W8BJX, W8BKM\*\*, W8BPS\*, W8BSY, W8CAT\*\*, W8CBF, W8CEL, W8CEP\*\*, W8CJ, W8CJK, W8CLJ, W8CLN\*, W8CME, W8CNO, W8COW, W8CQ, W8CR\*\*, W8CSB, W8CST, W8CZT, W8DEH, W8DLG, W8DQ, W8DPS, W8DYH\*, W8DVQ, W8DYQ, W8EB\*, W8FE, W8GU, W8HL, W8HN, W8IS, W8JD\*\*, W8KR\*, W8LH, W8VF\*, W8VQ, W8WJ, W8WO\*, W8YA, W9AMO, W9ANR, W9APG\*, W9AQS, W9ASM, W9BAN, W9BAZ, W9BHC\*\*, W9KJ, W9BN, W9BNI\*, W9BZO\*, W9CCP, W9CFL, W9CFQ, W9COG, W9CRV, W9CYQ\*\*, W9DBJ\*, W9DEJ, W9DJR, W9DLQ\*, W9DRE, W9DSC\*, W9DTK, W9DXZ\*\*, W9EHD\*, W9EIA, W9EMR, W9EPO\*, W9EPX, W9EPY, W9EQZ, W9FAA, W9FCW, W9FXT, W9FYO, W9GCF\*\*, W9GIY\*\*, W9GJX, W9GKL, W9GPC, W9WF, W9ZAL.

7000-ke. band: W1ABI, W1ABZ, W1AE, W1APQ, W1ASO, W1AXV, W1BES, W1BJD\*, W1BJL, W1BMR, W1BRK, W1CFT, W1DP, W1IA, W1KL, W1MK\*\*\*\*, W1ZB, W2AC, W2ADL, W2AEB, W2AEY, W2AFO, W2AFR, W2AGU, W2AHP, W2AJD, W2ALO, W2ALP, W2AMB, W2AOF, W2AOU, W2APN, W2ANB, W2AXG, W2BBY, W2BCE\*, W2BDJ, W2BG, W2BHZ, W2BJJ, W2BJV, W2BMM, W2BPE, W2BPH, W2BQF, W2BQX, W2BRD, W2BRH, W2BWF, W2BWK, W2BXT, W2BZB\*, W2CDS, W2CUZ, W2CXL\*, W2DX, W2FN, W2GG\*, W2IC, W2JC, W2MB\*\*, W2RT, W2WT, W2ZC\*\*, W3ACM, W3ADO\*\*, W3AER, W3AHP, W3AIY, W3ANH, W3AOJ, W3AQZ, W3AWM, W3AWN, W3BBH, W3BFH, W3BUF, W3CJN, W3CKL\*, W3CWN, W3EP, W3HY, W3KR, W3LA\*, W3NT, W3SJ, W3ZK, W3ZN, W4AAU, W4ABV, W4ACI, W4AEW, W4ALD, W4CZ, W4DV, W4EC\*\*, W4EL\*\*, W4FR, W4FT\*\*, W4HA, W4HE, W4IS\*, W4LB, W4LM\*\*, W4LQ, W4LU, W4LY, W4OI, W4PE, W4PF\*\*, W4PK, W4QL, W4QT, W4VA, W4VK, W4WE, W4WT, W5AAK\*, W5AEM, W5AFN, W5AFX, W5AHI, W5ANQ\*, W5AT, W5AUC, W5AUG, W5AWA, W5BAD, W5BCM, W5BEK\*\*, W5BFP, W5GP, W5IQ, W5JC, W5JD, W5PA, W5RR, W5TD, W5UX, W5VQ, W6AC, W6ACL\*, W6AD, W6AEO, W6AGR, W6AHP, W6AIM\*, W6AIU, W6AIX, W6AJ, W6AKC, W6AKD, W6ALU, W6AM\*\*, W6AQB, W6AYJ, W6BET, W6BKM, W6BKX, W6BLD, W6BSN, W6BWI, W6CBP\*\*, W6CGJ, W6CUH, W6CW, W6DCV\*, W6DIO, W6DLN\*, W6DOZ, W6DPF, W6DYV, W6EB, W6EDJ, W6EFO, W6EHY, W6EPF, W6EQX, W6ESA\*, W6EW, W6GI, W6HM\*, W6JU, W6KD, W6LX, W6OJ, W6QL, W6SC, W6TM\*\*, W7ACK, W7ALM, W7ALW, W7EL, W7LT, W7MP, W8AID, W8AIE, W8AHC, W8AHN, W8AXQ, W8AWK, W8AZW, W8BAU\*, W8BBH, W8BCF, W8BCQ\*, W8BDU, W8BEQ, W8BFH, W8BFM, W8BHZ, W8BJX, W8BKU, W8BM, W8BND, W8BNT\*, W8BOR, W8BOS, W8BRG, W8BTI, W8BUH, W8CAU, W8CDO, W8CH, W8CHG, W8CIB, W8CKO, W8CLJ\*, W8CPC, W8CTJ, W8CUT, W8DAH, W8DC, W8DLG\*, W8DME, W8DOZ, W8DQK\*, W8DSA, W8DSW, W8DSY, W8DTE, W8DUD, W8EA,

W8EM, W8ET, W8EY\*, W8FZ, W8HE, W8IM, W8JD, W8LI, W8LT, W8MA, W8NP, W8NV, W8OQ, W8UA, W8UD, W8UF, W8VP, W8YA, W8YB, W9AAG\*, W9AAQ, W9ACJ, W9ACU, W9AE, W9AED, W9AEI, W9AFN, W9AIP, W9ALS, W9ARA\*, W9ATH, W9AVY, W9AXP, W9AYU, W9BCA, W9BCS, W9BEN, W9BEU, W9BEZ\*, W9BIR, W9BJA, W9BMW, W9BMX, W9BNO, W9BOA, W9BQG, W9BVR, W9BWT\*, W9BYE, W9BZO, W9CBK, W9CDU, W9CFL, W9CIY, W9CK, W9CKQ\*, W9CKZ\*\*, W9CLQ, W9CME, W9COS, W9CPS, W9CRV\*, W9CUH, W9CVN\*, W9CWL, W9CWS, W9CWX, W9CZF, W9DBJ, W9DCV, W9DDQ, W9DEF, W9DFY\*, W9DHH, W9DJH\*, W9DRD, W9DRF, W9DSC, W9DSK\*, W9DXP\*\*, W9DYZ, W9ECI, W9EDT, W9EFR, W9EGE\*, W9EGF\*, W9EHD\*, W9EHI, W9EHO\*, W9EIJ, W9ELL, W9ELX, W9EMN, W9EMR, W9EPI, W9EQG, W9ESP, W9ETH, W9ETP, W9FAG, W9FEQ, W9FHY, W9FIL, W9FIS, W9FSE, W9FUL, W9GAR, W9GCO, W9GCP, W9GDH, W9GDM, W9GHV, W9GKF, W9GKJ, W9GKL, W9GPC, W9KB\*, W9KD, W9KPF, W9LF, W9MI, W9NR, W9OB, W9RP, W9NJ, W9PY, VE2CA, VE3EO\*, VE3XC, VE5EC, VK2HC, VK3BP, VK3PP\*, VK5HG, VK5IT, VK7DX, K6BBC, K4DK, K4KD\*, CT2AC, Y8IX, E8RIO, S8IAP.

14,000-ke. band: W1AS, W1AZE, W1BJD, W1WE\*, W1WV\*, W2AEY, W2BVD, W2FB, W2FL\*, W2FPP\*, W2GG, W2JN\*\*, W2MB, W2QF, W3AHP, W3CEE, W4EL, W4FK, W4FQ, W4RC, W4WE, W5AAB, W5AAK, W5BEK\*\*, W5QL\*, W5QU, W6BVX, W6CUH, W6DCV\*\*, W6DNS, W6EGH\*\*, W6EW\*, W6WB, W7AOQ, W7BF, W7EK\*, W7EL\*, W7WL, W8ABQ, W8ATH, W8AAU\*, W8BNT, W8CMI, W8CPC\*\*, W8CRA\*, W8PL, W8TZ, W8WO, W9ABU, W9AFN\*, W9AJA, W9ASL, W9ATH\*, W9AZE, W9BDW, W9BFB, W9HGB, W9CKZ, W9CNS, W9COK, W9DDQ, W9DGH, W9EH, W9EHD, W9ENF, W9EQG, W9ERZ\*, W9EXW, W9FEC, W9FPN, W9FRQ\*, W9SJ, VE1AL, VE1AP, VE2AC, VE2CA, VE4AI\*, VE4FY, VE5AW, FM8CR, CT2AC, PY1AH\*\*, PY1AW\*, CE1AH\*, CE3BF, D4DDM, G5BJ\*, G5BY\*, G5HP, G5IS, G5ML, G6LL, G6WT, G6XB\*, Z1ZAC, Y8IAP, FQ8HPG, PW2IH, XFMLY.

### GOOD 'PHONES

3500-ke. band: W1ABY, W3AEX, W8AJH\*, W8RD, W8WF, W9AFN, W9BJW, W9BPQ\*, W9RWI, W9DAQ\*\*, W9EHD, W9FFR, W9FLZ, W9MM.

14,000-ke. band: W1BJD, W2GJ, W5QL\*\*, W6KT, W8DL, W9ANZ, W9BRD, W9QY.

### WELL-OPERATED STATIONS

W1ANA, W1BYM, W1MK\*\*, W1WV, W1ZS, W2AG, W2ALU, W2BME, W2CC, W2CXL, W2FF, W2FP, W2ZC, W3ATJ, W3CEE, W3CXL, W3EE, W3GS, W3LA, W3NF, W3ZB, W4AHZ, W4EC, W5AHI, W5BH, W6AD\*, W6AKD, W6AKW, W6ALU, W6AM, W6AMW, W6AWG, W6BOQ, W6CHI, W6CUH, W6EIB, W6ERK, W6GI, W6HM, W6KD, W7AAT, W7ACY, W7LP, W7MP, W8ABV, W8AHC, W8AJC\*, W8APQ, W8ARO, W8AUT, W8BAU, W8BKM, W8BRS, W8BYD, W8CAT, W8CCS, W8CEO\*, W8CZ, W8COW, W8CPC, W8CR, W8CUG, W8DCV, W8DGN, W8DHT\*, W8DII, W8DLG, W8DPI, W8DUW, W8DYH\*\*, W8DYZ, W8JD\*\*, W8PL, W8YA\*, W9ACU, W9AFN\*, W9ALU, W9AYU, W9BAZ, W9BJA, W9BJO, W9CKQ, W9CKZ, W9CRV, W9CUA, W9CYQ\*\*, W9DOX, W9DQN, W9DSC, W9DXZ\*\*, W9EDW, W9EHD, W9GIY, W9OQ, CE1AH, PY1AH\*, VE2CA, VE3EO, Y8IAP.

NOTE.—The stars indicate the number of extra time stations were reported.

## DIVISIONAL REPORTS

### ATLANTIC DIVISION

**E**ASTERN PENNSYLVANIA — SCM, Don Lusk, W3ZF — I want to congratulate and thank the entire section on the mighty fine totals turned in this month. Particularly I want to express my gratitude and appreciation to the Frankford Radio Association. They certainly are a lively bunch, and it is beginning to look as though this club is the one last link in our section's traffic totals. Through

the efforts of several of its members, W3LC, W3AOJ, W3AHZ, W3AKB and W3AVI, amateur radio was well represented to the public at the American Legion Air Races held September 6th and 7th in Philadelphia. Their work was very much appreciated by the American Legion officials, and the operators were invited to a banquet by the Mayor of Philadelphia. They also received an enthusiastic letter of thanks and commendation from the Naval Reserve. We

have also to the credit of the club the amateur radio station at the Philadelphia Electric and Radio Show, a grand total of two thousand three hundred and fifty messages being collected at this exhibition. The xmitr used at the show was a neat 50-watt xtl-controlled affair belonging to W3AOJ. W8EU has a new station using the "coupled heart" circuit. He tied the knot last February and didn't tell anyone until this report. Well, OM and OW, we congratulate you and wish you every success. Miss W3AKB has certainly spent most of her evenings to good advantage helping and pounding brass at the radio show. FB, Fran. Jim Roberts, W3UH, has a new 852 perking on 3500 kc. Look at his total for this month. Excellent, OM. And look at the fine totals of W3MC and W3UX. Lightning hit W3UX with result that 210s, 281s, 222s and what have you were scattered all over his shack! Our old RM comes back to life with a nice total. He is looking for you fellows that want help with skeds, etc. W3DZ has done a good job with his Naval Reserve work. W8VD is helping out the Army net work. W8DHT reports the Electric City Radio Club of Scranton has reorganized and now has 25 members. Fine bia, OM. W3GS had one day on the air and handled all his tfe in that time. W8CWO is still pounding away, and sends in a long list of Prehistoric and Inconsiderate signals. How about accepting an 00 appointment, OM? W3AQQ is having trouble trying to operate his station with school and wot not taking up his time. W3EV is using a bk in system and is hunting for the bounds. By the time this is being read by you, new ORS certificates will be mailed, and all that I can ask is to keep the ball rolling like you have this month and we will give them all a chase. W3ZF changed back to his old job again, and is now on the air regularly on Monday and Thursday evenings looking for ORS men in this section on 3500 kc. How many would like a sked with the SCM after 10:30 p.m.? Traffic: W3BU 2350, W3UH 484, W3MC 237, W3ZF 233, W3UX 164, W3NF 132, W3AKB 108, W3AQQ 94, W3DZ 85, W8CWO 24, W8VD 21, W3GS 18, W8DHT 17, W8EU 8, W3EY 14, W3ATC 1664.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Forrest Calhoun, W3BBW — Many thanks for the splendid reports this month. I feel sure if we keep up this kind of work we can soon reach the top. No doubt you all know about the new ORS system so if you want to hold yours keep sending in your regular reports. If you don't; well, you won't have any certificate. See November QST for all the dope. Maryland: A nice bunch of the fellows reported this month but still not 100%. W3AFF visited the SCM and most of the DC stations, but returned home in time to handle a few. W3AOO changed his Xmitter to a hi C TPTG and reduced his plate voltage. W3LA sez super audio is hot. W3ZK put in a new 852. W3BBW is back on every a.m. from 1:30 until 7 W3PQ is complaining of a certain ham taking up most of his dial. W3NY can't get tfe anywhere. Delaware: This state is trying hard to compete, but it still seems that a few are doing the work of many. You Delaware fellows should help out. W3AIW reported a nice bunch. W3ALQ lost his job. Too bad, OM. W3AJH sez "nil" as usual. District of Columbia: Now for the big parade. Our new ORS, W3CXL, is sure pounding them out and takes the lead from W3BWT, who still maintains his high rating. W3GT came back this month with a big total. Welcome, OM. W3PM has a new MOPA and it is FB. W3CDQ sent in a fine report. W3ARB, ExW8AOB, is working at Bustan, and will be on soon and looking for skeds. W3AFU still needs Asia to make his WAC. W3IL is an old-timer and will be going soon. W3AWA, W3BAT, W3BAS and W3DDR are all new in DC. Let's hear from you, OMs. W3CAB had quite a few visitors; among them were the daughter of the President of San Salvador, Mrs. Julio Mejia, and her husband, whose brother operates YSIFH and was fortunate enough to contact W3BWT while they were in Washington. W6HM also visited W3CAB, as did W3AFF, and W3LU who hitch hiked to the West Coast and back. W3OZ worked the coast (West) on 3500 kc. W3AI is trying to get his CC to have a razor edge. W3AKR is breaking in a new YL op.

Traffic: W3CXL 1130, W3BWT 436, W3GT 64, W3AFF 49, W3AIW 27, W3AOO 20, W3PM 19, W3LA 18, W3ZK 14, W3BBW 11, W3CDQ 11, W3CAR 10, W3PQ 5, W3ALQ 3, W3AJH 3.

WESTERN PENNSYLVANIA — SCM, Robert Lloyd, W8CFR — W8CUG leads the section this month. He has resumed his old winter schedules and says traffic is plentiful. W8DLG runs a close second. He handled Philadelphia Radio Show traffic. W8GU reports schedules and 00 work.

W8CMP, our traffic-handling Director, is making his fall schedules. W8AVY is busy with the affairs of the Amateur Transmitters' Association. W8DUT gets on as often as possible. W8CEO is going to work on 14 mc. W8AJE is in the Air Reserve Corps. He says W8ARC and W8CPE are active in his locality. W8YA is experiencing some trouble with the Radio Commission. W8ASE still pursues his MOPA with hopes of making it perfect. W8BNU lost a week of operating while in the hospital. Glad you are well again, OB. W8AAQ reports good work with low power. W8AYH had a two-hour QSO with RX1AA. W8APQ is busy with the Army Net. W8BXG has a new power supply. W8DYL is on 3.5 mc. with a new transmitter. The Amateur Transmitters' Association of Western Penna. elected its new officers at the last meeting. Hunter Lohman, W8OC, was made president, R. R. Richeimer, W8BSO, secretary, and A. Mag. W8OW, treasurer. The club looks forward to a very active year. W8CFR is working on 7 mc. He and W8CUG attended the Erie Amateur Radio Club's Third Annual Banquet. W8KD is keeping schedules. W8DIL has a transmitter at the University of Pennsylvania under the call W3EB. He works on 3.5, 7 and 14 mc. and wants to QSO some of his old friends, who know him as W8DIL.

Traffic: W8CUG 300, W8DLG 262, W8CFR 21, W8GU 17, W8CMP 9, W8AVY 7, W8DUT 7, W8BNU 84, W8APQ 69, W8AAQ 51, W8AYH 17, W8KD 16.

WESTERN NEW YORK — SCM, John R. Blum, W8CKC — Using a 210A in his transmitter, W8QL, the big boy from over the hills, makes the B.P.L. this month — fine business, Mark. Big birthday party at W8DEZ and W8CBE. W8DHM is on with a nice crystal job. W8IH is rebuilding his fone. W8CUT is working low power for a change. W8BAG is off the air. W8BTY and W8PU are new comers. W8COO and W8UT attended a ham fest at Syracuse. W8WC passed his commercial second. New officers in the Syracuse Club: President, W8AST; Secretary and Treasurer, W8BYO; W8BYD-W8DSA and W8AAZ are new O.R.S. W8AWM is off the air for a while. W8DLU is a new U.S.N.R. station. W8OA is chief op. W8DME is busy with U.S.N.R. traffic. W8CLL is experimenting with tuned receiving antennae. W8CKC has an 860 and a sked with W1MK. W8BIF is too busy with school to be on the air. W8CMN is on with a new push-pull outfit. W8NW works 7000 mostly. W8CSW has been off the air with sickness, but has fully recovered and is with us again. W8DII keeps busy with skeds. W8DSP has skeds with W1UE and W8QL — no wonder he runs up such a total. W8AKC is on 14 megs. most of the time. W8BHK is pessimistic about radio weather. W8BUP has western skeds. W8BJO will take southern traffic. W8ON also had a birthday party, one year. W8AFM is building a nice new dynatron oscillator. W8CHG has his new voltage feed treds working perfect and we don't mean anything else. W8CLB is active on 7 mc. W8CEZ is on with fone. Rochester has a new radio club — good luck, fellows. W8QB has gone back to the old M.G. again. W8CJO is looking for 7-mc. sked. W8DSS has some new schedules. W8DRJ is working DX. W8AAC works VK. W8IV is a new call in this district. W8CRF reports a gud hamfest up in Schenectady. W8CNX is too busy for traffic work. W8AAZ has had a sked with W9OT for four years. W8ABQ is building a new receiver. The F.L.T.S. held their annual banquet October 25. W8BDV handled the business end and sure had one fine party. Good speeches, good eats and good fellows were in abundance. We hope they have another next year. The traffic total is the best we have had in some time. 100 per cent increase in number of stations reporting and traffic handled.

Traffic: W8QL 155, W8DSP 57, W8BJO 53, W8DSA 34, W8BHK 25, W8TZ 25, W8CKC 16, W8DII 10, W8BFG 6, W8AFM 4, W8BUP 6, W8CHG 3, W8CEZ 3, W8QB 2, W8BIF 1, W8AYU 5, W8CL 3, W8ADG 5, W8AJ 42, W8CPC 43, W8AAZ 37, W8CRF 56, W8AAC 3.

SOUTHERN NEW JERSEY — SCM, Bayard Allen, W3ATJ — Good weather is with us again. Our Route Manager, W3SM, had his portable smitter, W3ATC, going at the Phila. Radio Show and handled 1664 messages there. FB, Bob! W3BUF handled a few and is building a new MOPA Phone outfit. W3BDO is rebuilding. W3AWH is a frosh at Yale. W3EM is experimenting with antennae trying to see why his sigs don't cross the Delaware. Hi. W3BAQ constructed a very successful A.C. receiver and is occupying our 7000-ke. QRM band. W3AWV is using a type '01A in a TNT circuit and is kicking out FB on 7000 kc. W3AWL is on again with a new receiver and Xmitter. W3OH is stepping out FB on 14,000 kc. W3FQ is heard frequently working

nice DX. W3KX has a nice 14,000-kc. phone going. WSDJV is now W3RD when QRMfm R.C.A. Victor allows him to be on. W3ANR and W3BEU, ops at WCAM, are constructing three xmitters for operation on 3.5, 7 and 14 mc. W3ATJ is starting a sked with V87AP in Ceylon. W3BAN has a new xmitter and only needs some juice in his home to get going. Hi.

Traffic: W3BAQ 8, W3BUF 29, W3ATJ 14, W3AWV 15, W3EM 2.

#### CENTRAL DIVISION

**K**ENTUCKY — SCM, J. B. Wathen, III, W9BAZ — With the good radio season coming on, reports should improve each month. The Louisville gang installed a complete station at the local radio show, taking over 500 messages. W9EYW, club president, desires to thank every one for his cooperation. Route Mgr., W9AZY, reports that few requests are received for skeds. *Make use of his services;* he will get what you want. W9OX builds fine receivers (Adv. not paid for). W9JL took a drop, but still has a good total. W9ARU likes radio shows — gets traffic then. W9ALR is getting out very well on low power. W9CNE breaks into print. W9GGB advises that W9GIJ is trying to have a xmtr installed at Centre College. Wish you luck. W9ZZE returns to Kaintucky with a string of skeds. W9AIN is now working on 7 kc., but will be on 3.5 kc. soon. W9FZV is operating the Louisville Police broadcast station. W9GAL has gone to Panama as operator on a United Fruit ship. W9BAZ visited Danville and Bowling Green. W9CIS is working regularly in A-A net. W9GJE wants 7-kc. skeds before noon. W9FQN has new plate transformer; blew his other one. W9CDA turns in a better report than several ORS. May be some replacements. W9BWJ takes time off from drilling wells to drop us a line. W9ACS has changed jobs, and has more time to pound brass. W9EQO checks in with a good total. W9BAN buys BC receivers for a dollar. Quite a few other Kentucky stations are heard regularly, but never report. Please do.

Traffic: W9AZY 104, W9OX 103, W9ADT 101, W9BAZ 96, W9ARU 49, W9JL 46, W9FKM 40, W9EQO 23, W9FQN 18, W9AIR 17, W9CNE 15, W9EYW 15, W9CDA 7, W9GGB 6, W9AIN 3, W9ZZE 3, W9BWJ 1, W9FZV 1.

**M**ICHIGAN — SCM, K. F. Conroy, W8DYH — Well, boys and gals, here's the low-low on the up-ups: W8DED makes the BPL, and wonders if Michigan can make the 3000 mark. Why not? W8RP (exW8BJT) enjoys traffic and asks for more and more. W8MV used a 210 instead of a 204 this month, with fair results. W8PP enrolled at MSC again. W8AJC is going to show us how to handle tfe again, via the Army net. W8DOV is in the market for a high-power transmitter, if the price is fifty cents! W8DDO rectifies his 550 with 112as! W8WG is QRL school, but handles some. W8ACW QSY'd to 1149 Drexel A., Detroit. W9EQV radioed his last report, and some HAM let it die — that's a dirty trick! W8PQ has worn out two alarm-clocks trying to work VK! Get out the brass band, W8BRO is coming back! W8CU see he had a flat tire on the way home from the Club. He doesn't say whether she pounds brass or not. W8BJ celebrates another year — it isn't the years, it's these celebrations that age a fellow! Hi. Good news: W8TJ is moving to Detroit. W8CJ sez too many mags in Spanish give your bug that Spanish drawl. W8AE has a power-leak near his QRA. W8BRS and W8OV please note. W9CE proves: "It was just the wx." W8CLN, our new OBS, is CC 3814 kc. Please QSL. Here's an example of the ole spirit: W8DMS, who pounds Morse all day, makes the BPL just to put Michigan where we belong. Thanks, Steve. W8JD is building a station at the National Guard Armory. W8FX should try a directional antenna — north. W8CKZ is getting set. W8DFE is thinking of cusstal — sorry to lose you, OMs. W8CEP is QRL, so requests a temporary cancellation. W8CAT says doublet receiving antenna is FB. W8BMG is a new tfe handler at Kalamazoo. W8JX is at 1391 Lakepointe, Grosse Pointe. W8CJL says two Cleveland stations turned down traffic for there, so he had to mail seven — at least some one has the ole spirit. FB, Mac. W8AJL says, "Blow some my way." W9EGF, W8ASO and W8ACB are rebuilding. W8WO claims the children take up all his time. W8DWM is pounding 'em out on 7 mc. Miss W8JH is now a "colitech" student. W8BRS is spending lots of time on his bug-buzzer outfit now!! W8DJQ cusses W8GZ and his relatives — single-wire feed. W8GP works 'em with the antenna off. MIM. W8BTK is back on 3.5 mc. W8DYH boasts a new 210. W8AKN blew his 210. The ops at W8SL (WYE) are going traffic again. At VE3EC ham (?) fest,

WSCYX carried off the prize for the most stimulating tale — Nize guy, this CYX. WSDEN (the great) has taken up singing — the neighbors will present DEN with a saxophone, soon. W8CEV traveled east and went west. Congratulations, OM. Miss W9GJX says her "Rogue's Gallery" collection is increasing rapidly. W9HK has the U. P. stations hooked in a tfe net. FB. W8DEH uses the "Trinitroluol" circuit. MIM. W8DZ's sister wants to learn code — I know a darned good teacher! W9AXE is rarrr' to go. W8AUT is QYL. W8CVU spends most his time on 3.5 mc. W8BBX QSOed all districts 8 watts input. He says W8BRT has a code class at home. Keep a sked while resting your supper (Dinnah) and we'll be all set.

Traffic: W8DYH 801, W8CAT 366, W8DED 242, W8DMS 210, W8DEH 125, W8DFE 105, W9GJX 100, W8BJ 76, W9HK 76, W8BBX 70, W8SL 53, W8RP 52, W9EQV 49, W8PQ 44, W8BMG 43, W9CE 43, W8CVU 38, W8MV 38, W8OV 36, W8BWJ 33, W9AXE 32, W8DDO 29, W8CLN 28, W8BTK 22, W8DJQ 22, W8CJ 19, W8AJC 18, W8CJL 14, W8DWM 12, W8GP 11, W8WO 10, W8WG 8, W8FX 7, W8AJL 6, W8AUT 6, W8TJ 6, W8AKN 5, W8ACW 5, W8DOV 5, W8PP 5, W8AE 3, W8BRS 3, W8CKZ 3, W8JD 3, W9EGF 1.

**I**LLINOIS — SCM, F. J. Hinds, W9APY — Things look a bit better this month, but we need more traffic and more traffic stations. Get your friends to report. W9DGG has a schedule with NN1NIC for traffic. W9MI is doing fine work with his schedules and traffic. There is a new 3.5 antenna system in use at W9FCW which is set in concrete and is 25 feet high. A new TGTP is in use at W9AFB. W9BVP has come out of the hospital — we all hope you are OK now, OM. W9CKZ is rebuilding with a 3.5-mc. crystal. W9DZM receives special mention for his big totals, as usual. Most of the traffic was Army, so if the rest of you boys want big totals, get in on the Army or Navy Nets. Our old reliable, W9DXZ, is rebuilding the outfit and will soon be on banging away with messages. W9FI has a new Xtal set going. The Mercury Arc is giving DC results with a good filter at W9BRX. W9BIR reports QSC terrific and schedules gone haywire due to bad WX. W9ACU is installing a dynamotor to replace the B Batteries. W9EMN says bad weather has made it hard to keep schedules. W9GJJ is rebuilding the phone set and will be on 7000 kc. also. W9AMO has a nice crystal on 3755 kc. A TGTP has replaced the old reliable Hartley at W9GIV. W9ENH is to be found on 7 and 3.5 mc. for traffic. W9ERU reports direct to Hqs. W9FO reports the Chicago Radio Traffic Association meets in the U.S.N.R. Armory at the foot of Randolph Street on the first and third Thursdays of every month. W9DWB has built his new station at North Central College — Naperville, Ill., under the call of W9CUX. W9CCZ is building a Screen Grid receiver. The new set at W9CNY is a crystal and is getting out in fine shape. W9DKF has had 1200 QSOs in last six months and reports traffic picking up. W9ANQ is on strongly on week ends. W9DBB (Ex 6) reports traffic and traffic stations scarce here in the middle of the country. Let's get going, fellows, and help a real traffic man. The tube at W9FZW went bad, but the station is on again. Hi. W9CF is on with a 210. The Egyptian Radio Club has a new Club House and is now affiliated with A.R.R.L. W9BDW is on both 7 and 14 mcs. W9FTX is doing nice traffic work. W9FGD has QSO'd 600 stations with the same old 201-A on 7 and 3.5 mc. W9BZO swears by his new AC National receiver. W9QI has a new Silver-Marshall receiver going nicely. A new Push-Pull TPTG is working at W9FUL. W9BEO is rebuilding an AC transmitter. Hi. W9AVE is building his outfit to fit into the dining room. 3.5 mc. is going well at W9CYB. W9DAX has his set completed now and will soon be on. W9CKM and W9EII figure they can build one good station instead of two, so there will be a fine signal from northwestern Illinois shortly.

Traffic: W9DZM 852, W9BIR 201, W9MI 185, W9AMO 135, W9ACU 74, W9DBB 63, W9BZO 54, W9DKF 54, W9FCW 54, W9QI 38, W9EIP 37, W9CBK 30, W9CSB 29, W9DGG 26, W9ERU 24, W9BRX 23, W9CUH 23, W9FGD 22, W9DZU 19, W9FUL 18, W9AFN 17, W9APY 16, W9GIV 15, W9CNI 10, W9BDW 9, W9FTX 7, W9BBI 6, W9EMN 6, W9FI 6, W9BBR 5, W9DOX 5, W9FZW 5, W9ANQ 4, W9FPN 2, W9GJJ 2, W9FAG 1, W9FZW 1, W9GFI 1.

**O**HIO — SCM, Harry A. Tummonds, W8BAH — "EVERY ORS GET AN ORS"; check over your Nov. QST, gang, for the dope on new ORS Certificates, and write me. Another month with reports in fine shape and the OHIO total is going up. W8BGX leads in traffic and makes the



BPL. WSBAC has had trouble with his new antenna, and also reports will be on fone soon. W8TK has some FB skeds, and reports that traffic and conditions are getting better. W8CRI, genl. RM, wants the gang to write him about skeds. W8APC has some good skeds lined up for next report. W8BDU was up in Cleveland to take a Commercial exam. W8NP has some FB skeds. Nearly all the gang are now reporting skeds. If you are not lined up yet, write your RM. W8DU reports burned out filter and rec. tubes. W8BZL is rebuilding and reports that the Buckeye A.W. Radio Assn. is going full speed now. W8CX boosted his total to 13 this month. W8DDQ, the Norwalk Amateur Radio Club, reports that the club is going in fine shape. Their regular QRH is 7000 kc. W8CFT is on 7 and 14 mc. now, with a new 250 W. Xtal job, and is ready for skeds. W8CK says that it was a busy month down on the farm. W8CWA, Cleveland Wireless Assn. station, reports 9 mags. Slump in traffic reports is due to getting men ready for R. I. this month. W8DIH holds daily sked with W8APC on 3750 kc. W8ADS is getting ready for 14,000 DX and receiver is working FB now. W8EJ is out of operation just now, but will soon resume sked with W8EB. W8LI handled traffic from Los Angeles Radio Show. W8DPF has shined up the old set to go after new records this winter. W8RN reports still on the lake puddling along on KFNA, but will be home on the job in Bedford soon. W8OQ reports that he is all set to turn in some good work next month. W8IF is in Toledo now, and will be inactive for a while. In the meantime he is visiting W8BTM. W8CNO is now on 7022-3710 kc. W8AQ will be lost to OHIO Section for awhile, and is now with the Seiberling Rubber Co. in Toronto, Can. Windy, W8GZ, is on 3750-7200 kc. He wants Skeds in Cleveland. W8BBH is still rebuilding. W8DBK reports the U. of D. taking most of his time. W8CIY hopes resume his skeds soon. W8ARW reports 8 this month without any skeds. W8BAX is now on with a new 50W Xtal job. W8BYG has applied for ORS. W8ATV is having trouble with power supply. He reports a new ham in Lima, W8BGU. W8CSS has been rebuilding. W8CNM handled the unlucky number, 13. W8EQ had a great time in a recent electrical storm, which ruined parts of his trans. W8BEA has just been appointed an ORS. W8AKA, the Cleveland Amateur Radio Assn., reports the station shut down for two weeks to refinish the operating room. The club inspected W8APY's new 500-watt 14-mc. fone, and had a great time at Euclid Beach. W8BGX wants skeds with Cleveland, Columbus, Cincinnati and Pittsburgh and keeps one with W8DYH. Well, gang, the total is going up in fine shape and reports are coming in well. Now let me remind you again to check over Nov. QST regarding new ORS. "Every ORS Get and ORS."

Traffic: W8GZ 105, W8CNO 75, W8DIH 49, W8NP 31, W8BDU 28, W8CRI 27, W8TK 23, W8BAX 21, W8DPF 18, W8DU 16, W8BEA 16, W8ATV 16, W8AKA 15, W8DBK 14, W8CX 13, W8BAC 12, W8CWA 9, W8ARW 8, W8ADS 6, W8APC 4, W8BBH 4, W8LI 5, W8DDQ 2, W8CK 2, W8BYG 1, W8BGX 310, W8CNM 13, W8CSS 5.

INDIANA — SCM, George W. Graue, W9BKJ — Many of the ORS in this section are still reporting inactivity, and it is hoped that all will have their rebuilding done soon. To make this column grow reports will be necessary other than from ORS stations, so send in that information, OMs. The Ft. Wayne Radio Club has elected R. L. Hupp, W9CLF, as President, succeeding E. W. Springer, W9BWI who resigned because business keeps him from attending club meetings regularly. W9DHJ is putting in remote control for the coming winter. Ex9UL, an old spark ham, is coming back into the game. Welcome, OM. W9DBJ will be on the air again after an absence of several months. W9FYB has a new antenna for 3500-kc. operation, but reports it as NG. W9GJS has two transmitters under construction; one for 14 mc. and the other for 7 mc. W9BHM changed his QRA, and will be going again in a few weeks. W9AAI has a new device for recording Amateur Fone reception. W9BWI has a machine shop in his basement, and solicits ham work. W9CKG has QRM from college. W9CVX is proudly displaying his recently acquired yellow ticket. W9DWL reports a new push-pull receiver that's a Whizz. W9GFA is back with WOWO. W9CLF has a pair of 860s working FB. W9AIO is having trouble with the new Band Box Super. W9CKY leads this month with his traffic total. W9FO is QRL with school work. W9BKJ is in bad need of a cuspidor since the old chm. rect. has been junked.

Traffic: W9CKY 36, W9FCX 31, W9AKJ 25, W9DHJ 17, W9CKG 9, W9AIP 6, W9DSC 6, W9GJS 6, W9BKJ 9, W9ETH 17, W9CVX 10, W9AET 8.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9GFL is our only BPL station this month. He is using separate transmitters for 3500- and 7000-kc. bands, and wants an appointment as Route Manager. W9DTK is using two crystals, 3715 and 3750 kc., and shifts his frequency by simply changing crystals. W9EBO reported direct to Hartford. W9OT has a new A.C. short-wave super nearly finished. W9FAW will have a new 50-watt transmitter going soon. W9BIB hasn't much time to get on the air, but says he is glad he still has the job — hi. W9YF will be off the air after Nov. 1st as their license expires. W9VD has a new 14-mc.  $\frac{3}{4}$  wave Zepp antenna up which throws out a mean signal.

Traffic: W9GFL 106, W9DTK 29, W9OT 5, W9FAW 2, W9VD 9, W9EBO 58.

#### DAKOTA DIVISION

NORTHERN MINNESOTA — SCM, C. L. Jabs, W9BVH — From all indications this coming season will show more activities than ever before. Reports are increasing every month, and here is hoping the splendid cooperation continues. W9EHI says DX is fair and activity good in Duluth. W9GGQ has trouble with his rectifier, but is installing a new one and is hot after traffic. W9DOE reports traffic and snow. W9CTW has his  $\frac{1}{4}$  KW going and has resumed his schedules. FB. He also wants the schedules of other stations in the section reported to him. W9EGU is lining up schedules and reports good luck on his pheasants. W9DOQ is active in Duluth after spending the summer in Eveleth. W9EHI, the President of the A.R.A., will be active with the coming of cold weather. W9BCT still ops at WRHM. W9EHO attended a ham fest at St. James, W9EAT being the host, and reports a fine time. 9GKM has a new filter and antenna, so is ready for any traffic that comes his way. W9FFL works on 14 mc. with a 201A. The Junior College station, W9YK, will be on 14-mc. fone soon. W9FAQ worked X9A with his 201A. The SCM hopes to be on regularly after the new puddle jumper is limbered up. Please read the dope on new ORS in November QST and send your applications and old ORS in for renewal at once. W9GKO sends in a nice report on activities in Duluth and A.R.A., and is collecting a power supply for his Xtal rig. This probably will be the present SCM's final report, and at this time the next SCM is unknown, so send your reports to me in case you have no new SCM's address by the next reporting date. It has been a pleasure to carry on these duties for the section and A.R.R.L., and here is hoping you will all put your shoulders to the wheel and give your whole-hearted support to the new SCM, Vy 73, and see you on the air often.

Traffic: W9EHI 15, W9BVH 13, W9GGQ 11, W9ARE 11, W9CTW 7, W9EGU 3, W9DOQ 2.

SOUTH DAKOTA — SCM, H. T. Cashman, W9DNS — W9DB reports Army Net growing. W9DKL came in with a nice wad of traffic, and reports increase in power. Atta boy! W9ALO puts out a nice sig. and wants to play with some one on 56 mc. W9CFU is another new reporter who's getting lined up nicely. Send some flowers to W9DGR, OM! W9DRG blames the pheasants, but says he'll be along any minute now. W9DIY tried to heat the shack with his grid leak, and isn't on any more. Reports were better this month. Thanks, Oms, but from the noise in my cans there ought to be a few more!

Traffic: W9DB 9, W9DKL 20, W9CFU 6, W9DNS 3.

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — There is more activity in the state now, but not nearly as much as we should have. Is there any one in the state who can qualify for the job of Official Observer? If so, please write the SCM. W9DGS tells us he will be on the air more now that the World Series is over. We hear from a non-ORS this time, W9AZV, who turns in a good traffic total. Our ORS at Fargo, W9DOY, has an 865 now, and expects to be going soon. He also joined the A.R.R.S. W9DYA has the outfit perking now, but finds it hard to get time to operate. W9DM is a member of the A.R.R.S. now. The SCM keeps A.R.R.S. skeds and handles a little traffic as a result.

Traffic: W9BVF 120, W9DGS 30, W9ALV 20.

SOUTHERN MINNESOTA — SCM, J. C. Pehonshek, W9EFK — W9COS leads the Section with his TWELFTH CONSECUTIVE BPL report. A solid year in the BPL is something for any strictly "one-man" station to shoot at. He has handled 6005 messages in that time. Can anyone beat it? X29A visited W9COS while in the states. W9DRG is leaving the game, having sold out. W9BNN is a new ORS. W9BNN has a number of new men in the game at Heron Lake. W9EY is gg to be on soon, as will W9GBZ at Lakefield. W9CKU is getting out FB. W9AJU is nw attending the U. of Minn.

and keeping in touch with home by virtue of a sked with W9CYA. W9BN is almost all set for another big traffic season. W9EAT held a hamfest at St. James last week, with about ten in attendance. W9AQH handled more than his share of traffic this month, despite heavy business QRM. W9AIR has been hamming as usual, and has an able assistant in W9EAT. Herman reports a new ham at Round Lake. W9BKX is putting another 852 in. W9EJR is hunting tt mythical "best" receiver. W9FAD and W9FAJ, brothers, at Jackson are coming along fine. W9FMB is having his troubles, but gradually overcoming 'em. W9EYL has a new pair of 281s. W9EFK is attending nite school. W9GHO has a new sax and is learning to CQ on tt. Hi. W9FRI is op'g once in a while. W9FLE is keeping a few skeds, but complains of a scarcity of traffic. W9DGE is going to be back at his old QRA on Sheridan Ave. by the time this is in print. W9AAN of Hewitt, Minn., was in town as was W6BJX, of P I traffic fame, and his wife, W6ALM. They both wish the Dakota Division 73 and expressed their regret at not being able to meet more of its members. W6IL, exW9HL, was QSO W9BVH, and he also sent his 73. W9ELA-W9BTW are getting out quite nicely. W9DSH is on full swing and wants traffic skeds. The Sixth District will remember him as W6AWR, W9DHP, W9CIX, W9DOP, W9AMK, W9AJU, W9AOK, W5RR, W9ELA, W9BTW, and ex9ELJ are all attending the U. W9EAH is working for General Mills. W9DH, W9BYA, are still chasing BCL QRM for the Northern States. W9CCX, W9FLG-VE4BT and Ken Pepper from WPL are nw with the Mpls Police station. W9YC seems to have a scarcity of operators, altho the station is getting out well. W9AKN is busy at school with football. Any one who wants one of the new ORS certificates will have to make application, as I felt tt if a fellow doesn't hv tt much ambition he doesn't deserve one. Hi. There is a large amount of activity that I have only second-hand information about, and I would very much like to hear from the non-ORS, whether fone or cw, each month as that is the only way that every one will know what is happening all over the state. Let's hear from ALL of you; Fairmont, Lakeville, Northfield, Jackson, Madison, Bellingham, Appleton, Milan, Round Lake, Luverne, Morristown, New Ulm, Mankato, Anoka, Hopkins or St. Peter, no matter where you are, or why, tell us about it. I want to hear from every village, town, hamlet, city, municipality or what have you? After this impassioned appeal, something ought to happen. At that I forgot Marshall, Owatonna, Le Seur, Pipestone, Redwood Falls, Browns Valley, Osceola, Winona, Rochester, Caldeonia, Essig, Rushford, Fort Snelling and Minneapolis, all of which have some ham or hams who are all asked to give us sum dope.

Traffic: W9COS 168, W9DRG 157, W9BNN 57, W9BN 54, W9AQN 58, W9AIR 6, W9EYL 3, W9AKN 1, W9EFK 6.

#### DELTA DIVISION

**T**ENNESSEE — SCM, James B. Witt, W4SP — W4CW sends in the best report this month. FB, OM. W4AFS has fone on 3500-ke. band and also works bunch of skeds on AA net. W4AGW has 250-watt xmitter going now. The new O.R.S., R.M. and O.O. certificates are out, and all O.R.S. in good standing will receive new certificates at once. Those who have failed to report the last two or three months will be cancelled. Get busy, fellows, and send those reports in. I have received some complaint as to why East Tenn. does not get better representation in this column. My report is made out from reports received from the different stations, and unless you send in your report it is impossible for your section to be represented. W4SJ sends in his first report.

Traffic: W4CW 59, W4AGW 11, W4AFS 10, W4SJ 18.

ARKANSAS — SCM, Henry E. Velte, W5ABI — We can tell by the number of stations reporting, that Radio dx weather has at last arrived. W5HN would like to hear more of the gang on the Army-Amateur network each Monday evening at 8:30 p.m. W5BRI is a new station at Little Rock. Welcome, OM. W5LEK will soon have a MOPA on 7 and 3.5 mc. using a 210 tube. W5IQ continues to get out well with his 210. W5BMI is working on both 7 and 14 mc. W5BKB turned in his report by radio, as did W5RW and W5BPE. Thanks, OMs. W5ABI is planning a 3.5-mc. fone for this winter. W5SI has his station located at the airport in Pine Bluff. W5AAJ reports everything OK and is our "BANNER STATION" for this month. W5SS had to have an operation, and will be off the air for a while. Hope you are well by this time, OM. All old ORS certificates are being cancelled and new ones issued in their place. The new

certificates are beauties and well worth working for. Remember, gang, I must hear from all present ORS holders before I will issue them a new certificate. This is done so that inactive stations will not be reappointed. Get busy and let's hear from you soon. We are in need of more ORS and the SCM will be glad to hear from any of the gang that are interested. Let's see who will be "Banner Station" next month.

Traffic: W5AAJ 25, W5BMI 23, W5ABI 22, W5SI 19, W5BKB 12, W5IQ 8, W5HN 7, W5BRI 4, W5RW 2, W5BPE 2.

LOUISIANA — Acting SCM, Winfred B. Mask, W5BDJ — Very few of the members of this section knew before hand of my appointment as acting SCM, hence the very small number reporting. We will do better next month. W5RR has been very active on both 7000 and 14,000, reporting lots of dx including a ship 800 miles east of N. Y. C. FB. W5AWL is active on 7000 and has applied for another station license; he states the Shreveport gang is trying to arrange a station for the annual State Fair. W5AYZ is a YL op in Shreveport. We would appreciate reports from all the YL ops of La. W5BHV attended the Houston Convention in company with Buddy Moore, a would-be ham of Monroe. They had a FB time, but the morning they returned to Monroe they had a wreck and demolished W5BHV's car. Buddy went to the hospital for three days. W5BKL is heard pounding away quite regularly. How about a report, OM? W5BDJ is technician at KMLB in Monroe and has a crystal-controlled UX250 on 7000. Come on, gang, let's have your reports and put Louisiana over the top.

Traffic: W5RR 67, W5BHV 41, W5AWL 34, W5BDJ 6.

#### HUDSON DIVISION

**N**EW YORK CITY AND LONG ISLAND — SCM, V. T. Kenney, W2BGO — FB, Gang! Two of our stations make the BPL on deliveries this month, and all reports received show that traffic is on the increase. Many cancellations and appointments are being made at this time, so good work is expected during this season. Manhattan: W2SC leads this boro and the section for this month, and promises activity galore in the future. W2BNL has been down south again, and during his trip kept his portable, W2ZZH, on the air on 7 mc. W2BZN is on again after closing down his summer station, WSAPK. W2AJP has gone to M.I.T.; therefore that station will be silent during this season. Bronx: W2BPQ leads the Bronx in traffic and has been elected president of Headquarters Company in the Signal Corps outfit that both W2BDJ and W2AFT were elected secretary and treasurer, respectively, in. W2AII now uses a MOPA with two '10s and is getting Xtal reports. W2CYX has rebuilt the Xmitter and receiver and is all set for heavy traffic. W2AFO, ORS and OO, gets plenty of traffic on 7 mc. and is keeping skeds with ZL, YV, CE, TG, K6, HH7C and X9A. W2AQQ has a Xtal outfit going now. W2AET and W2ANG still do their share of traffic work, and W2AJJ, De Witt Clinton H. S., has five ops on duty every day looking for traffic. Brooklyn: Another BPLer this month is W2BIV, who also keeps busy as an OO; he leads his boro in traffic. W2BJF, altho very busy, manages to handle some traffic. W2PF, Radio Aide, 2nd Corps Area AA Net, works the W6s regularly on the 3.5-mc. band. W2BEV is still pounding brass. W2CCD, holder of a white ticket, has returned from upstate where he installed an experimental station, and is now heard at his home station again. W2BRB continues to experiment, and reports no activity on 28 mc. Long Island: W2AVP, RM, as ever, is the only reporter from this part of the section, but his consistent skeds with all U. S. districts does a lot to make up the deficiency.

Traffic: Manhattan — W2SC 125, W2BNL 18. Bronx — W2BPQ 60, W2AII 42, W2CYX 39, W2BGO 39, W2AFO 26, W2AQQ 26, W2AET 9, W2ANG 8, W2AJJ 6. Brooklyn — W2BIV 123, W2BJF 20, W2PF 18, W2BEV 1. Long Island — W2AVP 24.

EASTERN NEW YORK — SCM, H. J. Rosenthal, W2QU — The biggest event of the past month was the dinner and get-together given by the Schenectady Amateur Radio Association on October 6th. Two SCMs from the Hudson Division were among the eighty hams present, and that evening marked the beginning of a Naval Reserve Unit, that will soon be active in Schenectady. The Pioneer Radio Club of Westchester announce they are beginning a series of experiments on 56 and 28 mc. W2LU heads the traffic list again this month, and found enough spare time to recruit 11 men for the Naval Reserve. W2ACD, after being sick for



two weeks, made up lost time during the rest of the month with a slew of traffic. W2RD is now all settled in his new QRA and is battling out traffic on 14 Ne. W2BC, with his new 500-watt output xmitter, will be ruining headphones in all parts of the world. W2BSH and W2BIQ have just received their ORS appointments. W2BLU is arranging new skeds in order to put Port Jervis on the map. W2ACY has joined the Reserve. W2QN is also on the air now with a portable under the call of W2ZZL. W2CMQ is now located in Mt. Vernon and will be an ORS soon. W2ACB is still pounding traffic on 3.5 mc. W2AYK was off the air part of the month, but managed to handle some traffic. W2BAI is borrowing another 852 so that he can have a push-pull rig. W2OP is Net Control Station in the Army Net this winter. W2CJP is looking for a couple of good skeds with reliable stations. W2BER, after having trouble on 14 mc., has decided to stay on 7 and 3.5 mc. W2ANV wants to know when he will receive his new ORS Certificate. The certificates have been mailed to all ORS, so if you didn't receive yours get in touch with the SCM. W2BKN is still having trouble with the QRM on 7 mc. W2LU and W2ACD have been appointed Route Managers, so if you want to arrange skeds, get in touch with them.

Traffic: W2BC 60, W2LU 130, W2ACD 95, W2RD 86, W2BSH 63, W2BLU 45, W2ACY 24, W2BAI 20, W2QN 16, W2CMQ 12, W2ACB 12, W2AYK 11, W2AI 11, W2OP 11, W2CJP 10, W2ANV 6, W2BER 7, W2BKN 3, W2BIQ 2.

**NORTHEN NEW JERSEY** — SCM, A. G. Wester, Jr., W2WR — W2JF has a few skeds working again and traffic is on the increase. W2AOS was at sea for a few days with W2DX and W2AGE for U.S.N.R. work on the final speed-trial run of the new cruiser flagship U.S.S. *Northampton*. W2CFQ is now located in Carlstadt. W2AGX is stepping out with a new 852. W2BPY has a few skeds working and is breaking in a few new hams. W2CJX broke in his new xmitter by working 6 new countries on 4 continents on Oct. 12. W2BJZ helped a few hams who were working out-of-band to get back in. W2BPG is very busy at college, but manages to find some time to operate. W2CDQ has been chasing around with the YL, W2CMK. W2AQM, the station of the Ridgewood High School, is stepping out strong. W2BZJ in Farmingdale handed in a nice traffic total. W2BLV sent in his initial report and expects to have an xtal soon. W2AMN is too bashful to send in a report. W2CPD is in line for an ORS appointment.

Traffic: W2JF 55, W2AOS 45, W2CFQ 8, W2AGX 5, W2BPY 23, W2CJX 9, W2CDQ 23, W2AQM 9, W2CMK 2, W2BZJ 40, W2BLV 12, W2CPD 34.

#### MIDWEST DIVISION

**NEBRASKA** — SCM, S. C. Wallace, W9FAM — W9FAM gets a good start this month, but lots of hard luck with transmitting equipment. W9DFR is back in the harness getting all tuned up for lots of tfe. FB, OM. W9DI has time to handle some tfe, but is going hard at school. W9BQO expects to have the old MOPA tuned up soon. W9EHW says tfe is picking up and expects to hand in a report that will make our eyes bulge out soon. FB, W9QY says he's about all ready to go in for blood. W9BQR has the fever for tfe now that the WX has turned cold. W9BLW is very QRW with AT&TCo schooling. W9DTH is building a new receiver and will be ready for hot stuff soon. W9BHN says no business this time; moving and getting license changed. W9EEW says very busy; too many 9's (Train orders) to QTC. W9DVR sends in his ORS on account of being too busy at present. Sorry to lose you. W9BYG is still plugging away on MOP Ry. W9BES is pretty busy conducting on R.R. W9CPJ is new R.M. for Nebraska. Give him a lift, fellows, and let's get going with skeds. W9CHB is pretty QRW at KMMJ and rebuilding new first class Ham station.

Traffic: W9FAM 58, W9DFR 9, W9DI 5, W9EQQ 5, W9EHW 1, W9BQR 2.

**IOWA** — SCM, H. W. Kerr, W9DZW — Better radio atmosphere this month. W9ACL tops the list for tfe, and can use west skeds. W9ELQ is arranging skeds, and will be on regularly by the time this is printed. W9FFD now has his xtal wkg on a 132-ft. (40-ft. feeders) Zepp. Look for him, gang, up with the fone boys. W9FLK radios his report. W9FZO is looking for tfe. W9FIF entertained the TSARC and displayed his 500-w rig. Honeymoon over, W9AWY comes to the fore with Des Moines report. Congrats. W9EFU's report went astray last month, but OK this time. W9FWG is getting out now. W9AHX is on 3500 and

7000. A new Des Moines stn, W9BFL, sends in a report. Come again, OM. W9BBB doesn't wish to be listed a "Dead Head" in the AA Net. Lt. Hayden P. Roberts is now handling the AA work at Fort Omaha stirring up Net interest; the SCM would like to hear from any and all who will take part in the AA Net. Iowa and Nebraska hams to the number of fifty met together at the Rome Hotel in Omaha and enjoyed a banquet and hamfest with Mr. F. E. Handy of Hartford as honor guest; many of the old Omaha gang were present. Now, let's have the traffic reports: New ORS certificates are waiting to be issued. Let's go.

Traffic: W9ACL 92, W9DZW 91, W9ELQ 58, W9FFD 24, W9FLK 22, W9FZO 21, W9FIF 17, W9AWY 11, W9EFU 9, W9FWG 5, W9AHX 4, W9BFL 3.

**KANSAS** — SCM, J. H. Amis, W9CET — Activity in Kansas Section is getting back in the old form. Quite a few of the gang desire skeds, so please get in touch with the RMs, W9FLG and W9CFN, who will be glad to fix you up. W9GHI has hopes for the BPL soon and is planning on putting in xtal on 7100 kc. W9CFN has two nice skeds going, but would like more for "long haul traffic." W9HL will have a low powered station going at the power house soon under a new call. He also reports a new ham in St. Francis. W9EBF is very busy at WREN. W9COY wants 56-mc. skeds and is also on 3500-ke. fone. W9FLG is still trying to get his xtal to perk. W9CET has a new lattice mast and a new receiver using two volt tubes. W9BHR has completed a new xmitter for the Kansas National Guard using a push-pull Hartley. W9EVT had to take his antenna off the house next door when they discovered he bothered them with key-clicks. W9DEB is building a new receiver using two volt tubes. W9BTG-W5ZZR has a new 852 on 7000 kc. and is working at KSAC. He reports that KSAC is running an amateur program from 12:30 until 1:30 each Saturday on 580 kc., and would like comments from the gang. Code classes for beginners start November 1st. W9GHR has a crystal going on 7000 kc. W9ESL continues to hold the world's record for blowing 866's. Don't forget the new ruling on ORS appointments. Please get in touch with your SCM at once, if you desire your appointment renewed.

TRAFFIC: W9GHI 10, W9CET 45, W9DFN 16, W9HL 8, W9EVT 8.

**MISSOURI** — SCM, L. B. Laizure, W9RR — W9ECI led in traffic in St. Louis, and is out for more skeds. W9DYJ handled radio show traffic, and stands second. W9FTA made third place. W9AAU tied with him for this. W9DXY rebuilt the works. W9FTA upset the dope by suddenly beginning to connect with foreigners raising his score to 25 countries. W9PW has 50-watter replacing the pair of 210s and reports better QRK. W9ATX shut down to rebuild, but had some traffic before that time. W9GHG is looking for DX on 14 mc. and sent in a list for "Calls Heard." W9DZN reports from his commercial job on the "P. J. Hurley" that he will be home again as soon as navigation closes. Webster Groves was represented by W9FUN who has been building a portable station. He secured the call W9GHN for same. W9GAR led the state in volume of traffic with 215, keeping 5 skeds on 7 and one on 3.5 mc. Nine "rahs" for West Plains, as second place in the state score fell to W9CRM. W9CXB sent in his first report this month to help out W9GAR and W9CPM. Three reports from Joplin stations this month: W9ENF is on 3.5 mc. and in with W9DCD, W9ARA and W9AWE for the AA net. W9CLQ increased power and rebuilt the antenna system, putting up two 60-footers. W9ASV is putting in a remote control rig in preparation for winter comfort. W9CDU reports for Nevada. W9EPX moved to Columbia and is getting on the air from new QRA. W9CJB built a new xmitter and is now building a receiver. W9BJA resumed skeds with several made and others in prospect. W9BGN represents St. Joseph. He wants skeds. Ex-W9BGO is now W5BQ at Muskogee, Okla. W9EDK is now in Vicksburg, Miss. Kansas City reports were rather scarce this month. W9BMA, with W9BMA and W9BMT as operators, has been on continually and turned in a total of 217 messages, which is the largest for some time in K. C. W9AKZ is trying to re-establish skeds for the winter. W9CFL stayed on 3.5 mc. for U.S.N.R. traffic, and built a new antenna system for the U.S.N.R. Armory. W9HJC and W9RR were assistants. W9DQN is still working late night skeds with the W.U. W9ZD has been heard on 3.5 mc. recently with low power tests. W9RR was on 3.5 mc. a few times to chew the rag with old acquaintances. W9BSB is on the road for G.E. these days. New ORS certificates are on hand to supply those who apply. All of the old issue are dead after Nov. 15th.

Traffic: W9ECI 121, W9DYJ 49, W9FTA 34, W9AAU 34, W9DXY 33, W9AMR 30, W9PW 12, W9ATX 4, W9GAR 215, W9CRM 137, W9CXB 14, W9ENF 16, W9CLQ 5, W9ASV 46, W9CDU 18, W9DHN 12, W9BJA 65, W9BGN 27, W9BMA 217, W9AKZ 17, W9RR 5, W9CFL 31, W9DQN 4.

#### NEW ENGLAND DIVISION

**WESTERN MASSACHUSETTS**—SCM, Leo R. Peloquin, WIJY—Our traffic total is by far the best since the new SCM took charge last August. Many thanks to the gang for the fine cooperation being shown. Let's keep up the good work boys and keep the ball rolling to a higher total each month from now until spring. About 15 members of the Springfield Radio Association travelled to Worcester Saturday evening, Sept. 27th, to pay the Worcester gang a friendly visit. A good all-round ham-fest was held, and the party did not break up until after midnight. Needless to say, everybody had a good time. WICPG leads in traffic with a fine total. WIASY is to be made Route Manager and is looking for schedules. WINS claims he gets more miles per watt than any Western Mass. station. His output is 6 watts. WIAJN sure is doing a fine job, and if he keeps on his call will soon appear on the B.P.L. WIBZJ has a YL now so guess he won't be at his key until colder weather sets in. WIZB is rebuilding, but has found time to turn in the second largest traffic report this month. FB, OB. Keep it up. WIBSJ says, "Got bit a little by the fone bug, but have used some serum and am C.W. again." WIAJD says most everybody up his way is doing most of his transmitting by fone. (Page WIBSJ for that serum, boys.) WIAPL sports two transmitters now; one on 14000 kc. and the other on 3750 and 7100 kc. WIBSN has a regular schedule with the Pacific coast. WIBVR is on regularly and keeps a schedule with WIBMX. WIASU is going strong with a peach of a crystal set on 3720 kc.

Traffic: WICPG 115, WIZB 110, WIAJN 110, WINS 72, WIASY 27, WIBVR 27, WIBSN 22, WIAPL 17, WIAKZ 11, WIAJD 10, WIJY 8, WIBSJ 4, WIASU 6.

**NEW HAMPSHIRE**—SCM, V. W. Hodge, WIATJ—The RM, WIIP, steps out this month and pounds out a bunch of real traffic. He is keeping six skeds daily on 3975 kc., but found time to add three new countries to his DX list. WIBFT and the Durham gang are getting out on 14 mc. WIAUY is keeping three skeds. WIAPK worked W. Va. on fone. WIAEF is putting up a new antenna and mast for the winter season. WIBAC is now on with a 210 and getting good reports. He, WIIP and WIBII spent a couple of days recently visiting hams in northern New York. WICCM, although confined to his bed by illness, is on the air at Grafton. He would like more skeds and traffic. FB, OM. WIBJF handled a bunch and is also keeping several skeds daily. The fellows with the reliable skeds seem to find plenty of traffic. Schedules count, OMs.

Traffic: WIIP 202, WIBJF 76, WIBAC 27, WICCM 9, WIAPK 2, WIBFT 1, WIATJ 1.

**CONNECTICUT**—SCM, Fred A. Ellis, Jr., WICTI—WIAMQ turns in a total that is a joy to behold. He takes first place, even higher than WIMK. Congratulations, OM. RP at WIMK has been busy with the new crystal-control transmitter which is now perking on 7 and 14 mc. He found time to pound plenty of brass, as is shown in traffic totals below. WIAMG has been transferred to Coe Cob and doesn't have as much time for radio. WIUE is back with us again, going strong, keeping six schedules. WIBVW is rebuilding with some new ideas in transmitter design. WIRP says traffic is scarce on 7 mc. Come up to 3.5 mc., OM. Plenty there. WIADW had a schedule with Yacht "Skipper" and delivered via WU. WITD says he borrowed a receiver and will be with the gang before this is read. WIBBU lost his entire outfit when the ceiling fell down. WIHD sends in a humdinger of a report, and should be an ORS in another month. He is helping WIBBU rebuild and has turned a BCL into a ham (WIBHV). WIBWM reports via radio CTNITE and says WINE is rebuilding for an 852. The SCM gave a short talk on traffic handling on October 8 to the members of the I Tappa Key Radio Club in Bridgeport, and is very pleased with the increased activity as shown by letters and reports received. WIBEA and WIAZP send in their initial reports. FB. Keep them coming. Officers of the club are: WIAZG, President, WIAKI, Treasurer and Vice-President, WIAVC Secretary. Reports for WIAKI, WIAZG and WICAL were received by radio via WIAKI and WIBWM. WIBHM has his push-pull 210 transmitter working and QSO's Europe. WIEQH-WIBI sends in his

report, saying to look for WIBI from Boston. Keep your ears open, gang. WIAMQ reports for WIHQ who is very QRL. WICJD reports direct by radio. The Twin City Radio Club held their annual Banquet October 7. WICBD-W9KL was down from Headquarters and gave a very interesting talk on Dynatron Frequency meters, the Hague Conference and WIMK's new transmitter. The TCRC is looking for new members. Here is your chance to join a live club, gang. Get in touch with the Secretary, John J. Morris, 74 Gorham Ave., Hamden. WICTI has been busy attending club meetings and catching up on sleep. Hi! Four schedules are being kept and more could be used especially with Stamford, Greenwich and New London. It is suggested that everyone stand by for WIAVX transmissions and check frequency meters. Always QSL these transmissions either by card or radio. Those of you who have not applied for re-appointment as ORS please do so at once. Remember CTNITE on the 15th. Every one welcome.

Traffic: WIAMQ 445, WIMK 422, WIHD 140, WIUE 135, WICTI 68, WICAL 36, WIAKI 27, WIAZG 6, WIBHM 12, WIBBU 27, WIBWM 1, WIAMG 1, WIBVW 7, WIADW 10, WIRP 10, WIBEA 12, WIAZP 15, WICJD 18.

**EASTERN MASSACHUSETTS**—SCM, Miles W. Weeks, WIWV—Radio Show traffic has been responsible for some large totals this month. WIACH, who had his portable at the Boston Radio Show, heads the list and makes BPL along with WIWV and WIBXB. Besides WIACH, WIAAO, WIKH, WIJY, WIBXB and WIWV handled the key at different times during the show and the booth attracted an usual number of interested spectators. A goodly number of ORS applicants continue to report. WIATX, a new ham in Norwood, is handling some tlc on 3500. WICAW is working for a commercial license and is also handling some tlc. WICHR is looking for an ORS. WIAFP starts reporting and also wants an ORS. WIAMB reports fine results with his new 14-mc. TPTG outfit. WICQN is keeping some skeds, but complains of school QRM. WIAZE continues to QSO DX on 14 mc. He was QSO FREARH in the Canary Islands. WILM handled some relays. WICCP reports some success on DX on 14 mc. besides some tlc on 3500. WIABG continues to keep a number of skeds on 3500 and gets his share of the tlc. WIAAT is waiting for a new power supply for his 204A. WIBXB handled some radio show tlc. WIWU reports considerable ham activity in New Bedford. A class of about 60 has enrolled for SW radio work at the High School. He visited WIBAT and Mr. and Mrs. WIAJC this month. One of our OTs, WIZE, is reported as still able to rig an antenna where no one else could. WILQ is again keeping his skeds with WIUE. WIADK is our latest ORS. He reports immediate success in his new location and expects more tlc from now on. WIASI reports his 852s are permanently wired up now and he wants additional skeds on 3500. The Twins, WIKH and WIWV, collaborated in working OA4Z and NL8SMI in Martinique, besides working Brazil and Argentina independently on 14 mc. They both have completed and put into use the Dynatron Oscillator described in October QST, and have put their wavemeters on the shelf, as a result. WIWV handled tlc from the Boston and Philadelphia Radio Shows. Have you heard the new slogan: "Every O.R.S. get an O.R.S.?" Some of the present ORS need to get after themselves first. Hi. It ought not to need a "Delivery Contest" to make all the ORS report every month. We need all your reports to help us beat Conn.

Traffic: WIACH 401, WIWV 354, WIBXB 226, WILQ 170, WIABG 86, WILM 69, WIKH 51, WIASI 45, WICCP 44, WICQN 44, WIATX 41, WIAMB 38, WIWU 29, WICAW 27, WIAAT 25, WIAFP 25, WICHR 18, WIADK 10, WIAZE 5, WIANK 4.

**MAINE**—SCM, G. C. Brown, WIAQL—On behalf of the A.R.R.L. and the Queen City Radio Club, the SCM wishes to extend sincere thanks to the official and operating personnel of station WLBZ, Maine Broadcasting Company, in Bangor, for making it possible to put before the Radio public short broadcasts concerning the A.R.R.L. and the work of the short wave Amateur. We are indeed grateful. On October 4 Prof. Everett L. Roberts, U. of M., WICNE, gave a very interesting talk on the purposes, history, and organization of the League and on October 18 the SCM outlined the spirit and work of the amateurs during certain emergencies during the past decade. More of these talks will be put on the air every two weeks during this fall and winter. Traffic took another slump this month, due to bad weather conditions. What is the reason that more of the gang

are not reporting? Send in your reports regardless of the amount of traffic handled. WIBLI is high man this month. He reports a lot of ham activity in Orono this fall among the U. of M. students. WIATO is a close second. WIANH reports a new ham in the making at Washburn. WIACW is on the air again at Mars Hill. FB. WIAHY says weather conditions are bad over his way. WICDX will be on regularly at Portland this winter. WIFQ recently received his commission as First Lieutenant in the Signal Reserve, U. S. Army. FB. Les. WIAPU has moved his station into a new shack and has a fine layout. WIBGZ, of North Berwick, is a newcomer this month. Welcome, OM. WIQH is building an MOPA and expects to push out a mean signal. WIALZ is planning on building a pee-wee golf course at his cottage. Fore! WIBFZ reports foreign dx is picking up. The SCM has a schedule with WIAHY. Watch for an increase in traffic totals.

Traffic: WIBLI 37, WIATO 34, WIANH 32, WIAHY 15, WIFQ 12, WICDX 11, WIAPU 9, WIAQL 7, WIBFZ 6.

VERMONT — SCM, Clayton Paulette, WIIT — WIATF leads the state in traffic. WIBD is active in Army-Amateur work. WIATF is joining. A new station, WIAOA, is on the air at Montpelier. WICGX has moved to a new location, and has a new xmitter built. He says that he expects to be on the air about December 1st. WIBJP has got new receiver going and reports that it works FB. WIBDX is very busy just now. Come across with some dope boys so we can have something to write up in this report, what are you all doing? Not much stirring up here. I don't seem to get out at all this year with my old wreck of a transmitter. Well, guess no more this time, vy 73 to all. Hope see you all before next month.

Traffic: WIBD 11, WIATF 35.

#### NORTHWESTERN DIVISION

MONTANA — SCM, O. W. Viers, W7AAT — Since W7FL and W7ASQ are the only reporting stations this month our report will be very small, and will continue to be small unless some more of the gang snap into action!

Traffic: W7FL 3, W7ASQ 12.

IDAHO — SCM, Oscar E. Johnson, W7AKZ — According to W7AFT the conditions on 7 mc. are getting much better. W7ABB hopes to have W7UQ at Moscow on soon. W7ALC spent all summer touring with a portable. W7AT raised his antenna off the roof and now gets out OK. W7GL requests tfc and promises rapid QSP via A.A.R.S. W7FB is still on 7 mc. W7AOO has new cnc-amp. rig on 3.5. W7AIV is building a new 50-watt rig. A rebuilding job keeps W7AII off. W7ALW is rebuilding KGKX. W7QB has returned from Alaska and is on 7 mc. W7AGH is finally on the air and reports a good time. W7AKZ works on 3532 and 7064 kc. wid xtal rig. W7AFN has moved again, and his place has been filled by W7AR. W7ACD is sending code practice on the 1750-kc. band. FB.

Traffic: W7AFT 19, W7AKZ 10, W7AT 1, W7ALW 1, W7ACD 18.

OREGON — SCM, W. S. Claypool, W7UN — W7ZD did wonderful work on tfc this month and has five skeds working daily. FB, OM. W7ALM tried to join Naval Reserve, but was three inches too tall. Hi. W7APE is showing up fine in the Coos Bay district. W7WL had the good fortune to attend Sacramento Convention. W7AMF is giving weather service to local airport by copying KUP WX broadcasts. W7PE spent a week hunting in Eastern Oregon. W7QY works good dx and handles some tfc. W7UG goes to opr. NPG wx. W7PL reports the Pendleton Amateur Radio Club doing splendid work. W7MQ is new OBS and applies for ORS. W7AIG reports poor conditions and the loss of a yf opr who has gone East to school. Tuff! W7AMQ is on 3.5 mc. agn. The RCARC have moved to new quarters at 1341 Belmont and have fine code class working. W7IE is on 7 mc. quite regularly. The SCM lost a BCL neighbor who committed suicide. Don't rush me, boys, and I'll tell you how it's done. Hi. The new ORS certificates will be with us soon but several non-reporting ORS will be out of luck. W7WL will carry on as RM hereafter, so communicate with him for schedule line-ups. A great deal of activity seems to have been aroused in Director's election in this division. May the best man win. Let's all get skeds and boost our section and division.

Traffic: W7ZD 207, W7ALM 70, W7APE 39, W7WL 35, W7AMF 14, W7UN 29, W7QY 12, W7PE 8, W7AIG 6, W7AMQ 5, W7QK 1.

WASHINGTON — SCM, Eugene A. Piety, W7ACS — Well, gang, your new Route Manager is W7OV. Those who want good skedules write him and those who have skeds in operation please let him know. The RM takes the lead this month but was handicapped by a hurt wrist sustained cranking his Ford. W7KZ of Olympia takes second place and says that what traffic he has is good stuff. W7KT sold out and is working in Seattle now. W7AAE is on 7 mc. occasionally. W7ACS is on with a nice xtal sig supplied with B Batteries. W7ACQ, W7ATV and W7APT report for the first time this month. W7AFX finds time to do a little work on the air. W7BB is so busy at the Y school that he doesn't have much time to push the 852. W7AHO is back from Alaska and on the air again. W7KO reports for first time in a long while. W7TK is the only station on in Everett, although W7ACY pounds brass once in a while. W7IT is on at Stanwood. W7BG and W7TX are looking for support in the Divisional Director election. W7RT says that dx is much better than traffic. W7IQ is a new station in Tacoma. W7KQ is cutting xtals for the hams now. W7EW, W7AQG, and W7LB are on in Tacoma when school work permits. Write our new RM for dope on traffic, fellows, and let's make this section talk loud!

Traffic: W7OV 89, W7KZ 41, W7RT 34, W7TX 29, W7KT 24, W7AAE 19, W7TK 14, W7ACQ 12, W7AFX 11, W7BB 10, W7AHO 8, W7KO 6, W7ATV 5, W7ACS 5.

#### PACIFIC DIVISION

SAN FRANCISCO — SCM, C. Bane, W6WB — Our friend, W6BIP, certainly seems to be the fair haired boy this month not only leading the entire gang in traffic but coping off second prize in both the receiving and sending contests at the convention. The boys all did themselves proud this time; 17 men reporting with two in the BPL. W6EKC shares honors with BIP. W6EKC reports with a fine total, and says he is running regular skeds with Hawaii and will be very glad to QSP K6 traffic. W6FK throws his hat in the ring for the traffic contest. W6ANW reports again after quite an absence. W6DFR's traffic is right up to his usual standard, which incidentally is plenty good. I'm glad to say that your SCM perked up and beat out the RM, W6ERK, for traffic honors. W6ABB is to be congratulated on his nice consistent reporting. He is right in line for an ORS. W6ETR went on a vacation, spent all his money and couldn't go to the convention. Hi! Incidentally I counted 23 men from S. F. at that convention banquet! FB! W6DPF hasn't been normal since he got an 852. W6CAL is getting to be a regular reporter, but he says that college holds him down so that he only gets on week-ends. We have a new man this time in W6BNA. He says he is interested in 56-mc. work and will welcome any correspondence or skeds relating to that band. W6ERK drops away down this trip because of a night job which he is holding down. W6PW is building a complete xtal multi-vibrator unit similar to that now operated by the Radio Inspector, Mr. Smith. Stevens is doing this solely to help the off-wave situation, and is to be applauded on doing this worthwhile work to which so little credit is generally given. We understand that W6KJ established a new non-stop record at the convention banquet. Hi, Hi, and a cheer! W6DZZ blows up 81's as fast as he can buy them (maybe faster), but squeezed in some traffic regardless. W6AMZ is another regular reporter. W6CIS handled a few, but like a good sport doesn't want to come on until he can get PDC power supply. FB, Ken. The East Bay SCM tells me that he has been getting reports from Marin County. The gang up in Marin (San Rafael, San Anselmo, etc.) are, therefore, reminded that this territory is part of the San Francisco Section and are requested to report to the SCM of said section. W6EPT sends in his report and says he wants plenty of skeds. He tells us further that Eureka has a new ham in the person of Ted Merrill, W6EKR. We are mighty glad to announce that the 1931 Convention will be held in San Francisco.

Traffic: W6FK 95, W6EKC 87, W6WN 68, W6DFR 60, W6WB 53, W6ABB 34, W6DPF 29, W6ETR 28, W6CAL 21, W6BNA 19, W6ERK 21, W6ATI 15, W6DZZ 8, W6AMZ 6, W6CIS 4, W6ANW 72, W6BIP 592.

EAST BAY — SCM, J. Walter Frates, W6CZR — After the fine showing last month due to the California Flower Festival traffic for the section took a slump this month because the gang couldn't get their mind off the convention in Sacramento, where they had a marvelous time meeting OM Handy and the rest of the fellows in the division. The new ruling requiring fifteen messages a month to hold an ORS certificate will go into force next month and an in-



crease in traffic is expected. W6ALX, the old reliable, in again at the head of the section this month through skeds with Los Angeles and other parts of Pacific Coast States. W6ZX, a new ORS, is the next man. W6ZX, who is mostly on in the daytime, reports that traffic is beginning to be awfully scarce. W6BYS has a new 210 xtal oscillator, a 50-watt amplifier, and a 250-watt final stage. W6BZU at Concord reports his 73 promptly this month and encloses his usual amount of traffic. W6AQO has been handling some traffic in addition to aiding the gang at the Oakland Radio Club carry out some club stunts. W6RJ, who oscillates between Oakland and Medford, Ore., where he is W7RM, reports that he won first prize sending with his left foot at the Coos Bay hamfest. W6AKB varies the monotony of collecting the gelt as treasurer of the Oakland Radio Club by batting out some traffic. W6AUT, new RM for the Napa District, reports that he has a crystal now and will have it on the air soon. W6CDA is using xtal control in a FB job on both 7,000 kc. and 14,000 kc. W6CZN says that his receiver went haywire and is now going to rebuild and make an A.C. receiver. W6BMS announces that he is going to put in a crystal, and that the A.C. receiver is finished at least. W6AOH at Santa Rosa is contemplating the construction of a 100-watt push-pull transmitter and says that he only needs another 50-watt to have the job complete. W6BUX at Angwin declares that he has an xtal outfit on the 7,000-kc. band now with a 7.5-watt. W6BI announces that he has built a new room in his house this month to be used exclusively as a radio room. Traffic handling will be his main object. He has no trouble with the north, south, or west, but has a great deal of difficulty getting his traffic east. W6EY is now rebuilding his outfit and will be on the air soon. W6CGM called up in a flurry of excitement to announce that he was finally on the air. W6EVD, W6DLT, and W6DGZ of Vacaville report themselves as active. W6AN is still working on 3750 kc. with a low powered transmitter, but most of his time is taken up with section affairs. W6DCZ is still grinding away at the torts and contracts in law college. W6ZM, the CRM, has a number of new plans afoot for more traffic, and is watching the slack ORS with a baleful eye. W6CZR will be back on the air again next month after an absence of several months. W6ZA is building a new type of super receiver and making his transmitter fill into his apartment in Berkeley. W6EDK has been in the Letterman General Hospital in San Francisco, but is back at home again. W6BBJ is making the welkin ring with fone on 3750 kc., and is sending out the League broadcasts on voice as an OBS. W6ACD won prizes at the convention for being the man with the biggest feet and of the tallest height. W6BDU was given a special prize for being the strongest man at the convention. W6ZM and W6EQF, SCM of Los Angeles, are arranging a new East Bay-L. A. traffic contest on a percentage basis. W6DWT is putting W6OT, the station of the Oakland Radio Club, back on the air, and W6ASP is still grinding crystals for the gang.

Traffic: W6ALX 242, W6ZX 80, W6BYS 31, W6BZU 24, W6AQO 14, W6RJ 14, W6AKB 12, W6AUT 9, W6CDA 7, W6CZN 6, W6BMS 6.

HAWAII — SCM, L. A. Walworth, K6CIB — All Hawaii is undergoing a complete rebuilding this month, with several new hams receiving licenses. Five high schools of the territory are building 3500-kc. fones for the Inter-Island Radio Fone Net. They are Maui and Lahainaluna on Maui. Hilo on Hawaii and Kalaheo on Kauai. McKinley Hi in Honolulu will become the Official Broadcasting Station November 1 and the hub of Inter-Island 3500-kc. fone net. Corporal Parucha of K6DV left for the mainland and, as this leaves that station completely to new inexperienced hams, the OBS is being transferred to K6YAL of McKinley Hi School. Sgt. J. C. Bailey, CRM of K6EWB, is taking three months furlough to see home folks, necessitating a temporary appointment during his absence. K6EGD of Hilo was in the hospital this month for removal of his appendix, and K6AJA set his portable up at his bedside for him. Soon he was telling Aussies and Zedders all about his pilikea (misfortune). SCM K6CIB has been giving talks on Amateur Radio over K6MB weekly for two months, and much interest has been developed. The Affiliated A.R.R.L. Club of Honolulu has taken the name of The Radio Club of Hawaii, which makes it the reorganization of the club of years ago of the same name and call OH6BUC. The call K6BUC is being asked for hoping to renew many old international friendships in this way, for this call is well known. Our reorganized club is progressing splendidly and great interest is being manifested. *Ham-Aloha*, the Hawaiian Section

news sheet, is being put on a subscription basis this month at \$1.00 per year. Other schools that have just started new radio clubs are Punahou, Mid Pacific, Kalakaua and Roosevelt. More than 100 students are enrolled in these four new clubs with possibilities of several new Hams being developed. A final check on convention receipts and expenditures showed a profit of \$10.45, which was placed in the Ham-Aloha fund. Traffic reports are very low this month.

Traffic: K6COG 145, K6CDD 131, K6YAJ 47, K6AJA 37, K6BJJ 20, K6CRU 15, K6ERH 15, K6BVP 13, K6ERO 5, K6BOE 4.

LOS ANGELES — Acting SCM, Chas. A. Nichols, W6ASM — Well, gang, this is your old friend, W6ASM, batting for the SCM again while he is away to the convention and a little vacation. Please continue to report to W6EQF, as he will be away only two weeks. Once again our message total is over 5000, and fourteen stations make the BPL. This is certainly FB. Let's keep it up! The A.R.R.C. is now affiliated with the A.R.R.L. and continues to meet under the towers of KGFJ. They have adopted a new policy now which is "More Radio and less politics." They will stage the next quarterly banquet in December. The Tri-County gang did some mighty fine work at the Los Angeles County Fair and handled 1440 messages. There is a new club now called "The Monrovia High Frequency Club," and they hold their meetings over the air. W6AHP was Chief Op. at the Tri-County Club booth at the L. A. County Fair. W6ERC-W6CVV-W6ADH were asst. ops. W6EGH did some nice work with dx skeds. W6QP continues his heavy traffic skeds, and reports that his new 500-watt xtal-control xmmitter is now on the air on 7180 kc. W6AOA wants to see a few more yls on the air. W6EKE is going to the Philippines to work for W6ESA's father and will be a "KA" very shortly. W6BCK is going xtal control. W6DEP reports that his KA sked is coming to the U. S. A., or rather the op. is coming. Hi. W6AGR reports that commercial stations busted up his sked. W6QJ says that his 852s in push-pull continue to push out and pull in the dx. Hi. W6WO has a new receiver and a new power supply. W6ABR says that his A.C. receiver is now settling down to work at last and is plenty hot. W6LN is going strong again, and was QSO ZL and VK 22 times in past month. W6CWT makes the BPL due to traffic from the Kern County Fair. W6AKW is using a new Zepp on 3.5 mc. and wants more So. Calif. hams in Army-Amateur Net. W6AEO wants ORS appointment and reports new 2-volt tubes very FB. W6AEC is A-la-Calvin Coolidge this month. W6DLI says that he was left out of October QST. Well, you are in this month, OM. Sorry. W6ESA says that screen-grid detectors are very FB and is now using one in his Pilot Wasp. W6EAF reports visiting W6AKW at the "Owls Roost." W6ACL is busy with school work, but managed to handle a bit of traffic during the week-ends. W6TE says that he pulled through the first quarter exams, so will be on the air some from now on. W6ZBJ is trying to organize a club in Santa Barbara. W6DAK is trying peaked audio in receiver and a d.c. note in the xmmitter. W6AM is still using his six-phase power supply and a reflector system on 7200 kc. W6FT now has xtal control and wants skeds. W6EEP sends in another Calvin Coolidge report. Ditto for W6EAU. W6BJC says the wind blew down his zepp, so now using Herts. W6CXW is interested in securing ORS appointment. W6AKD has been busy checking off-frequency stations. Better look out, everyone. W6ID has a new receiver which is a knockout. W6BGF has a bad case of QRM from yls. W6EQD says nothing new. W6DOZ does most of his work on 14 mc. now. W6DZI is on 3.5 mc. now, as QRM on 7 mc. was too fierce. W6ERL says that he is about to settle down for some nice winter dx. W6FJ has to work for a living now, so does not have much time for operating. W6AZL says that he took the commercial examination, but does not know the result as yet. Hope you passed, OM. W6FBF is now officially on the air and welcomes all QSOs. W6ASM is now with the Jackson-Bell Co. and is putting in lots of hours. W6CUX is now using a portable on 7 and 3.5 mc. W6BLS, who has a broken back, is getting along better now and will be on soon. FB, OM. W6BRO went to the convention with the SCM. W6QF changed his y! into an OW. FB. W6ETJ says that anyone wanting skeds please get in touch with him. W6IL has a receiver using push-pull detector and reports it is very good.

Traffic: W6AHP 1440, W6EGH 886, W6QP 701, W6AOA 606, W6EKE 223, W6BCK 185, W6DEP 168, W6AGR 145, W6OJ 129, W6WO 124, W6ABR 106, W6LN 106, W6CWT 98, W6AKW 80, W6CNC 294, W6WA 38, W6DOV 19, W6AEO 48, W6AEC 41, W6DLI 37, W6ESA

43, W6EAF 31, W6ACL 24, W6TE 24, W6ZBJ 22, W6DAK 18, W6AM 15, W6FT 15, W6EEP 14, W6EAU 12, W6BJC 11, W6ETJ 217, W6CXW 11, W6AKD 9, W6ID 9, W6BUZ 6, W6HT 5, W6BGF 4, W6EQD 4, W6AZL 2, W6DOZ 2, W6ASM 1, W6FBF 1.

NEVADA — SCM, K. L. Ramsay, W6EAD — It looks like W6CDZ is the only one who handles traffic in Nevada. The Nevada Amateur Radio Association is putting on an exhibit at the University of Nevada Homecoming Day. They have a transmitter and receiver set up in a booth for an exhibit and will take messages from any of the visitors to be sent direct from the booth. Nevada was represented at the Pacific Division Convention by W6CDZ, W6CRF, W6AJP and W6EAD, all of whom had a fine time. Mr. Handy rode from Sacramento to Reno with the Nevada gang where we had a little dinner and informal meeting for him. The fellows were mighty glad for an opportunity for a chat with him, and I fear he got a little behind on his sleep before we let him go. W6UO is busy with the Army Net. W6EAD is finished rebuilding and ready for the winter's traffic and rag chews. W6CRF is on with his 3500-ke. phone. The University of Nevada is building a ham transmitter for phone and CW. W6CDZ is going to school and hasn't much time for radio.

Traffic: W6CDZ 10.

ARIZONA — SCM, H. R. Shortman, Jr., W6BWS — We were favored by a visit from F. E. Handy, our Communications Manager, this month. Most of the gang were present at a meeting, and all profited by the talk, which covered most of the phases of amateur radio, and the SCM is particularly pleased with the revived interest which resulted from the visit. W6BJF reports thirty-four foreign QSOs with eight countries. FB! He also reports handling important traffic between Phoenix and the Philippines relating to an automobile accident. W6HLP leads the state in traffic. He made a trip from Stuart Mountain Dam to Phoenix to attend the meeting when C. M. Handy was here. W6CVR, a new ham in Phoenix, is working for the Power Company and promises to be on by the time this is in print. W6CAP, formerly of Lowell, is attending the University at Tucson, as is W6DGM, who was formerly W6BHC of Bisbee. W6BCD is back on the air with a new A.C. receiver. W6VU-W6BWS is getting the Xtal rig finished up and will be going strong very shortly. W6EOF has started work on a Xtal set using type '10s throughout. W6DQW broke one rectobulb, so is using half wave with 8 mikes filter. W6DGY is working on a crystal set, which will probably be completed when this is in print. W6DNC is changing to push-pull TPTG, and remodeling receiver. W6CCN is moving to Oakland, Calif., and going to school. W6DWP reports working on a new MOPA and will start on a super het receiver when he gets through. W6DJH is coming on with a crystal-controlled phone in a month or so. W6DCQ is working phone on 3500 kc. regularly, and upon the SCM's suggestion, he promised to report monthly again. Hi! W6AWD, W6BFA, and Ex-W6BGA, made a trip from Mesa to attend the meeting. W6BFA is working Aussies and Zedders with his low-power set. W6AWD is on the air lots, and getting out fine. Ex-W6BGA is building a TPTG and will be on soon — he hopes. Hi! W6CWI is on the air every day, and working out well. W6EAA, and W6DIE are attending the Y.M.C.A. Radio School in Los Angeles.

SANTA CLARA VALLEY — SCM, F. J. Quemont, W6NX — W6YU crashed into the BPL with a bang this month with 487 messages. W6YU still needs several Eastern schedules to complete their intensive traffic net. Another "Y" station, W6YG, is going to give W6YU competition. For handling consistent traffic, the prize goes to W6ALW. W6BMW is still on 7250 kc. and out for traffic as usual. W6DCP is situated on a state highway and has an advertising idea that is helping people get acquainted with amateur radio. FB. W6BAX, the DX king, is back on 7 mc. for a trial. W6CLV is rebuilding his station. W6BHY is on the air daily at San Jose and is always ready for traffic.

Traffic: W6YU 487, W6YG 213, W6ALW 190, W6BMW 28, W6DCP 8, W6BHY 69.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6ANV again leads the section in TFC. W6ACJ was the only one from this section to attend the convention. W6CTP spent a few days in the hospital after an auto accident. W6EOP built a new a.c. receiver. W6EPF is also building a new receiver. W6BAM has a new 50-watter going in Colpitts ckt. He and W6BVX are very QRL harvesting walnuts. W6ADC says very QRL college and sports a new Ford. The P. A. T. Club held a special meeting and had as guest

Mr. F. E. Handy from Headquarters, who gave the club a very interesting talk. All enjoyed the meeting very much. New ORS tickets will be issued soon so get in your reports, fellows. Next month, all ORS in this section will have their calls in this space so if your call is not listed you will know that you are no longer an ORS.

Traffic: W6AXV 83, W6ACJ 63, W6CTP 18, W6EPF 8, W6EOP 7, W6BAM 4.

#### ROANOKE DIVISION

WEST VIRGINIA — SCM, D. B. Morris, W8JM — W8DPO is the most active ham in West Virginia.

W8DPO reports two new hams in Wheeling, W8BOW and W8AAO. Let's hear from you soon, Boys. W8CBV is working great DX on 7000 and 14,000 kc. W8BWK is active on 7170 kc. W8HD sez he is working hard at the office with memories of the European trip still in his mind. W8BTV is back on the air again and going strong. W8DNN is trying to get some "Hams" to help him raise his 60-foot pole. W8BOK's phone station is being heard regularly throughout the middle west. W8DRL is also reaching out with his low-power phone station. W8JM and Ex-W8VZ renewed old friendships when Ex-W8VZ dropped in from Detroit, where he is now working with R. C. A. telephone. If all the hams on the air would only report, West Va. sure would have some report, but as they don't we will have to struggle on with the old reliables.

Traffic: W8BOK 46, W8QR 42, W9BTV 31, W8DNN 27, W8HD 15, W8DPO 12, W8DRL 12, W8JM 11, W8AAI 8, W8CBV 5, W8BWK 4, W8TI 2.

VIRGINIA — SCM, J. F. Wohlford, W3CA — W3CXM, a newcomer in our section, carries off the honors this month with his traffic. This station maintains about ten or twelve skeds, which accounts for the excellent work done. W3AAJ-W3WS coming on air with a 250-watter. This station has eight or ten skeds, and wants more. W3CFL, another newcomer to our district, makes a good report each month. W3AMB is using a 50-watter in Hartley. W3TJ overlooked reporting by mail, so sent it by W.U. FB, OM. W3WO is another station with about ten or twelve skeds. W3BGS and W3KG are back on the air after a little lay-off on account of getting new power lines and building new apparatus. W3BEV is getting junk together to come back on the air after several years lay-off. W3ZA is still working phone. FB, OM. If you handle any traffic, let us have report of it. W3BDZ revamped the whole outfit. W3BZ, we understand from good authority, has a lot of phone junk hid in the shack. Of course it could not possibly belong to W3BZ's outfit! Several new stations are on the air in and around Roanoke, W3BDW being one of them. W3ARU has just returned from three months' leave of absence, and I know he will be with us next month. We would like to see a little interest shown by some of you fellows around Norfolk. We would like to have your cooperation, as we need it, and I am sure you fellows can do a lot to help the monthly report. By the time this is in print we should be well on our way with the new ORS certificates which take the place of the old ones. The old ones become null and void on November 15th. See Nov. QST for further dope.

Traffic: W3CXM 448, W3WO 145, W3AAJ 27, W3FJ 42, W3CFL 18, W3AMB 8.

NORTH CAROLINA — SCM, H. L. Caveness, W4DW — We were very happy this month to receive reports from at least four stations who had never sent in reports before. W4TU reported a total of twelve messages for the month ending Sept. 15th, but the report did not reach the SCM in time to get in QST. Another new ham reporting for the first time is W4TR, who, by the way, is keeping four regular schedules. W4AEL gave us a thrill by sending in his report in a Postal Telegraph Company envelope. He has just received his "green ticket." And then here comes a letter from W4DQ, who has fond recollections of pre-war, pre-marriage (we understand the significance of that O.K.) and spark days, and who yearns for the good old rag chewing variety of QSO's because "the old rag remains to be chewed." We are delighted to receive his first report after his come-back. W4AA-W4NG gives us quite a bit of good, worth-while information. W4AA and W4NG are crystal-controlled either on 3567, 7134, and 14,268 kes., or on 3561, 7122, and 14,244 kes. W4AA has built a 75-watt job for W4ZH; a 412 as oscillator with 3555-ke. crystal, an 865 as first frequency doubler, a 210 as second doubler, and an 852 as power amplifier. W4ABC is now operating a 3572-ke. temperature-controlled crystal in a 75-watt outfit in the 7-mc. band most of the time. W4JR observes that we are



badly in need of more 4's on 3500 kc. W4UI is now on the air when time permits, and is always willing and glad to QSP. "Same here," says W4EG, who is still hammering away on 7 mc. W4FP has been appointed Route Manager for Western North Carolina, and if you are already keeping schedules, or desire some with some good reliable stations, see him on the air on Monday nights on 3500 kc. and in the mornings on 7000 kc. W4DW recently held a thirty-minute QSO with SP3DO, who reported his 14-mc. signals QSA 4, R 7, pure DC. W4ZB is handling traffic for the high school with good results.

Traffic: W4AA-W4NG 177, W4JR 34, W4TR 17, W4DW 13, W4AEL 9, W4DQ 6, W4TU 5, W4EG 1, W4UI 1, W4ZB 183.

#### ROCKY MOUNTAIN DIVISION

**UTAH-WYOMING**—Acting SCM, C. R. Miller, W6DPJ—W7AAH again leads the section, and is keeping several skeds. W7AAG blew one 50-watter, but has several more now. W7HX is still going strong. W6BTX is busy teaching school, but keeps several skeds. W6EKF is still too busy at KLO to pound brass much. W6DWH attended the Pacific Division Convention and won a "B" battery. W7ABO is getting out at last. W6DPJ is on again.

Traffic: W7AAH 50, W7AAG 31, W6DPJ 18, W7HX 14, W6BTX 10, W6EKF 4.

**COLORADO**—SCM, C. R. Stedman, W9CAA—Colorado Springs seems to be coming back to life again by the looks of this report. W9AOD is building a 75-watt crystal outfit. W9FBR and W9DNP, two other Springs stations, are out to beat W9AOD in traffic, if possible. W9FYT was also on the air at the Boy Scout camp near Colo. Springs. W9DQD has closed up till next summer on account of school, but will be heard at W9YQ this winter. W9CDE has been on some over week-ends. W9AAB takes the traffic honors this time. W9ESA is working a schedule with W9FAM, who in turn has a schedule with W7ASQ. Traffic for Montana and the Northwest should be routed thru these stations. W9GBQ is pounding out on 3500 kc. W9BQO is starting up again. W9ZE is moving to a new QRA. W9APZ is getting out a bit with 90 volts on a 112A, and keeps a schedule with W9EFP. W9EFP uses phone some and has moved to 1750 kc. for that work.

Traffic: W9AAB 99, W9AOD 79, W9DNP 77, W9ESA 79, W9DQD 31, W9GBQ 4, W9EFP 5, W9APZ 7.

#### SOUTHEASTERN DIVISION

**ALABAMA**—SCM, Robert E. Troy, Jr., W4AHP—W4KP leads the state in traffic. Watch his smoke, fellows. W4LM is going strong. He was appointed OBS. Listen for him on 7009 kc. at 12:30 p.m., Monday, Wednesday and Friday. W4AKM is getting back on after a lot of summer school. W4AG is coming along nicely, but lacks his old fire. W4VC has an MOPA going now. W4DD has a pure D.C. note. W4LJ just installed a 250-watter. W4EW is confined to his bed with a broken leg. W4PAI is building high-power CW and low-power fone outfits. The handshake to W4DV, a new fellow in Selma. Good luck, OM. W4TI and W4OH are having trouble with the BCLs. W4AIH is on the air again in Selma. W4DS keeps A.A. skeds with a 201A on 3.5 mc. Congratulations to the newly organized "Birmingham Radio Club." Our best wishes for success go to them. The SCM was very pleased by a visit from the Communications Manager, F. E. Handy. W4AAQ is not on much due to work at WSFA. W4AKB had another attack of YLitis! Fellows, drop me a postal card, at least, about the 15th or 16th. I'm not a mind reader and haven't televising eyes to see what you are doing. Good luck for the best radio season.

Traffic: W4LM 60, W4AG 8, W4AJR 3, W4ADL 10, W4AGI 12, W4KP 70.

**FLORIDA**—SCM, Harvey Chafin, W4AII—W4QL down in Miami is head man this month in the line of tfe. W4HC is next highest, and has a fine total for the first time reporting. W4QN and W4AIO says that traffic seems to be improving. W4UJ will be on again shortly. W4AKH handled 16 messages. W4KM handled his tfe from the Georgia Fair at Columbus. W4ABF reed some dx cards this month. W4DC has a new fifty on the air now. W4FM at JAX. is going to rebuild soon and use an MOPA with a 50-watter. W4BT is a new amateur down in Miami. His QRA is 27ONE, 23rd Street. W4SK is still on the air when not at college. W4AEM is keeping skeds with W4AIV and W4AGP,

and would like more with some of the southern stations in Florida. W4RU sure is getting out with those poor 226 tubes. Hi. W4ZU is now using a low power transformer because W4IK blew W4ZV's, the one that he was using. W4ALH is also on the low power list this month because he blew his filter condensers. W4TK says he is busy at WJAX. W4AC, W4SQ, W4PAW and W4AII have all been trying 3500-kc. fone and are getting out FB. All of the stations in Florida, please drop the SCM a line so that we can have a get-together party over the air or a rag-chewing contest. All fone men in favor of this, drop the SCM a line at once. There were twenty-four of the old ORS certificates issued, although I have had but six men ask for renewal. If you want a new ORS appointment, you should apply at once as the supply is limited. All ORS appointments were cancelled November first.

Traffic: W4QL 22, W4HC 20, W4ACM 20, W4QN 18, W4AKH 17, W4KM 13, W4ABF 10, W4FM 10, W4BT 8, W4SK 7, W4QF 7, W4AEM 7, W4ZU 5, W4ALH 4.

#### WEST GULF DIVISION

**SOUTHERN TEXAS**—SCM, H. C. Sherrod, Jr., W5ZG—Fall weather is certainly here, if the increasing number of stations heard from is any indication. This section was certainly well represented at the fourth West Gulf Division Convention, held on October 10th and 11th at the Rice Hotel in Houston. All of the gang got pretty well acquainted during their sojourn, and the many friendships and acquaintances made will not soon be forgotten. The Houston Amateur Radio Club deserves a world of credit for the punctuality with which the various attractions were presented. The manner in which the meetings were conducted deserves praise, and the Houston Amateur Radio Club deserves no small amount of credit for the very evident thought given the planning of this amateur congregation. Just as this is being written there comes a shadow to mar our pleasant memories of the convention just passed. It is with inexpressible regret that we chronicle the passing of one of our number, Mr. H. V. Flanagan, W5ATT of Corpus Christi, who was accidentally shot on October 15th. Words cannot express our loss. W5ATT was popular and a real credit to our bond of friendship, amateur radio. Houston: The Bayou City is surely represented, and from the number of hams on the air it looks like a tough year for the YL's. Calk, W5BHO, is on regularly and has a nice d.c. note. W5EI, Ward, is also very active keeping schedules with W2KJ, W4CX, and VE3CZ. W5TD, Tennant, who incidentally won the UX-852 awarded by the Houston Amateur Radio Club for the best amateur station in their city, sends in a nice report. He was QSO with Groves, W5NW, the day NW arrived in Manila, P. I. Loving, W5ZL, is on the air now, and seems to be getting out well. Havard, W5BKW, is also going again. W5OX renewed his extra first-class ticket and is threatening to come on with a crystal rig. (Believe me, fellows, it's a fine-looking piece of work, too.) W5LP, Chun, has retired on account of QRM from Rice Institute. LP won second place in the station contest above mentioned. DeBardleben, W5PK, is sorely afflicted, 'tis said. She lives in Gonzales, and it's rumored to be a bad case. Keeling, W5JQ, is a new amateur on the air. W5WL is planning to return as soon as the present QRM from the house painters subsides. Ernie Ross recently got his amateur ticket, and has been in something of a daze ever since. At any rate he was certainly pleased when seen at the convention, and at the banquet he was indeed the life of the party. W5ASM is on intermittently. W5BML is also getting out nicely working sixes regularly. W5BOC swears he is going to work New Zealand or bust something trying. Dasietta: W5BLD is on and working regularly. Galveston: Like every place else, things are picking up here with new stations coming on all the time. W5AVC, Berg, works regularly and is the island's best representative. W5BQJ, Weakley, is heard intermittently. Rattisseau, W5AUX, is still working on the crystal rig. Rouse, W5IM, is also heard occasionally. There will be two more stations here when Warriner, Ex5TT, and Scharpwinkle, Ex5ACR, obtain new licenses. The SCM is still cleaning up the wreckage resulting from a playful windstorm festooning his zepp and mast over the immediate neighborhood. The R. I. flatly refused to reassign our calls with a K in front of them instead of a W. Our contention was that we are on an island and should be placed in the same category as Hawaii and other foreign possessions. Even the fact that the Houston gang says we are foreigners didn't impress DuTrie one bit. Hi. Baytown: W5DS, Bohannon, is on regularly and doing some nice DX.

Corpus Christi: Nelson, W5MS, sends in a nice report. He is the new Official Broadcasting Station for that territory. W5ATY is out of commission on account of a heavy rain. W5AB, Parks, moved his station to the Aransas Compress Company to get away from heavy QRM from car line. W5BKG has several schedules. Get a QSO with her, fellows. She is a darn good operator. W5AQK is on regularly and handling traffic. W5ALV is also on consistently. He is the S. P. operator at Corpus. W5ZN is coming back after many silent years. FB, Ed. W5MX has a regular schedule with the Philippines, and says DX is coming back. Kerrville: Lawson, W5BKE, drops us some nice dope which is more than welcome. McKnight, W5ZB, is on consistently in the 7-me. band and handling traffic. San Antonio: Gallagher, W5AHH, is the sole representative for the Alamo city. The quality of the representation more than makes up for the quantity, however. Flatonia: Nesrta, W5AJD, reports as usual. He has a schedule with San Antonio and is a fine outlet for westbound traffic. Rosenberg: Behrendt, W5PU, is a newcomer and a most welcome one as his city has not been heard from before. Jacksonville: Allen, W5EQ, is another new reporter. It's good to see interest picking up in East Texas, as we need men there. W5EQ has been QSO with all districts but the seventh, and gets mighty nice reports with the lone UX-210. W5BRC is still waiting for "Uncle Dave" to send the rest of the parts for his transmitter. Greenville: Butcher, W5AL, is on occasionally, but politics have him occupied just now.

Traffic: W5EI 38, W5AJD 22, W5AB 22, W5TO 18, W5ZB 13, W5AHH 7, W5BHO 6, W5ZG 22, W5EQ 6, W5BKE 17, W5LP 16, W5PK 3.

NEW MEXICO — SCM, Leavenworth Wheeler, Jr., W5AHI — By the time this issue of QST reaches you, our regular Sunday morning QSO Parties, scheduled to begin Nov. 2, should be running smoothly. All known active stations were notified prior to that date. If any have been missed, please drop the SCM a card. W5AUW and W5AJR are both on the trail of an ORS appointment, and make a good beginning this month. W5BPJ is another newcomer in Albuquerque. W5AOE is on 14 mc. W5AIE is reported as having a new pair of towers rivaling KOA's. Hi. W5TV graduated to the 210 class only to have it go soft. W5BQE sends in his report on the first reporting date to come around since he got on the air. FB. Six daily skeds account for the large total of W5AHI this month. Prospects for an active winter season are promising with several of the newer men, noted above, reporting. The southwest portion of the state is still dead, however, and we should be gratified to hear of any activity in the vicinity of Deming, Los Cruces, etc. You fellows in Roswell and Clovis! Are you going to let the Albuquerque and Los Vegas gang show you up?

Traffic: W5AHI 489, W5AUW 15, W5TV 10, W5BQE 8, W5AJR 8.

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5RJ — W5HY still pounds out a few. W5BAM kept W5AKM in touch with his OW and sick baby while they were in Dallas. W5ARV worked VK and ZL. W5ARK worked a ZL with his lone 210. W5ASP reports by radio via W5BAD. W5AAE is working 14, 7, 3.5 and 1.75 mc. W5BAD worked ten foreigners in less than ten days. W5RJ, the SCM, has moved to 1614 St. Louis Ave. Please send reports to new QRA. W5BLU is working everything with his 201a with 180 volts. W5AUL wants an ORS. W5BND worked his first foreigner. W5RH is rebuilding. W5GZ also worked his first foreigner. W5SH is making preparations to get on the air again, after a two-year absence. W5AGQ is having a brain storm over xtal control. W5AZP is getting out OK.

Traffic: W5HY 85, W5BAM 68, W5ARV 46, W5ARK 34, W5ASP 31, W5AAE 25, W5AUL 21, W5BAD 15, W5RJ 14, W5BND 6, W5BLU 24.

OKLAHOMA — SCM, Wm. J. Gentry, W5GF — W5VQ makes the brass pounds for the last two months. Congratulations, OM. Now, Gang, this station has set a pattern for you to shoot at. W5BQW is the new Route Manager for Muskogee. Get in touch with him for traffic in Eastern Oklahoma. And W5ASQ at Ponca City is Route Manager for Northern Oklahoma. We need a couple of Official Observers. Who wants the jobs? W5CB just needs a little more tfe. W5AUV is back with us again. Welcome to the ranks again, OM. W5AYF is going fairly well on tfe. W5ALP has gone to school again. Sorry to lose you, OM. W5OJ and the Frederick gang made the convention at Houston and reports a very FB time had by all. W5AMC has an ORS certificate coming soon. W5AAV reports not much doing at his shack. W5QL is building a station for his buddy. W5MM is going

well with xtal. W5SW sure does like to have these oil wells in his back yard. They mean more \$\$ for tubes. Hi. W5BHW is on now and then with a nice PDC sig. W5GF is perking along about the same. Well, Gang, we are sure leaving the boys down south behind with tfe. reports. Let's keep them stepping. HW?

Traffic: W5VQ 636, W5AMC 73, W5BQW 58, W5OJ 51, W5CB 49, W5AUW 26, W5ASQ 25, W5GF 18, W5AYF 8, W5ALD 7.

## CANADA

Very encouraging reports were received from each division this month. From coast to coast the winter enthusiasm is taking hold with most SCMs reporting renewed activity in traffic, and a number of new stations and many old-timers getting into the fold.

SCM Thompson reports VE3DA operating a crystal-controlled transmitter, temperature control operating on all bands which should be very useful to us Canadians as a marker. If we had two more stations such as the above, one in the extreme East and another in the West, Canada would be well taken care of in this regard.

Van Alta, British Columbia, section sends in a very fine traffic total, leading by 100% over Ontario, who generally heads the list. This is good work for our West coast division. Let's have more of this and make this winter a record breaker.

Many Western stations are asking for Eastern skeds. Eastern stations kindly get in touch with your SCM or Route Manager, who will be glad to arrange skeds for you. Another idea, get in on the Wednesday evening all CANADA NIGHT, and get a real kick by working Canadians.

CANADIAN GENERAL MANAGER

ALEX REID, VE2BE

## MARITIME DIVISION

NOVA SCOTIA — Acting SCM, A. M. Crowell, VE1DQ — We welcome back an old-timer this month, ex-1AE, who is now using the call VE1AB with B battery supply on 14 mc. He and VE1DR have had many good rag chews on this frequency. VE1AS and VE1CC are at present in the woods, — on vacation, the scene of great activity being VE1DQ's camp, where they have a xmitter in action on 7 mc. VE1DQ is keeping sked with them from the city and shooting out latest dope on YLs, etc. VE1AX has had good success with his 3.5 mc. fone and is now polishing up his voice at the local B.C. station. VE1DM, former R.I., has gone to the U. S. A. for six months on new job. All N.S. stations are again asked to report. Let the gang know what you are doing.

## ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE3FC — Central District: VE3GT leads the Section in traffic and general activity. He hereby issues a challenge to the other Canadian stations for a traffic-handling contest, and with five good schedules we feel he is pretty safe. VE3EC, whose report should appear in the Southern District news, is up and coming with a nice traffic total. VE3AD writes a nice newsy report, and says that W9EXL and he got a write-up in the Elkhart, Ind., daily paper for a nice bit of free traffic handling. This lad's latest ambition is to contact some VE4 station. VE3GK wants to get on a Trans-Canada traffic route when one is formed. He reports that VE3BV is a newcomer on the air in his vicinity, and we all extend a hearty welcome. VE3BP has moved again. Where to this time, OM? VE3DA now has a real transmitter on the air, a crystal-controlled outfit with temperature control. His frequencies will be 3505, 7010 and 14020 kc., and they should be very useful as markers for the gang. VE3DW is still teaching the code to a bunch of prospective amateurs. FB. VE9AL keeps the usual schedules and is always on the air. VE3BC is getting a new transmitter into action with crystal control on 7175 kc. Speak up, gang, if you want schedules. Northern District — G. V. Lawrence, VE3ET, Acting SCM — VE3HA is doing great work on

traffic. VE3HU has broken out in a new place and bids fair to become a BPL member. VE3BD also handles some. VE3BG is coming along and will soon be on with several operators. VE3GX, with the help of VE3HA, sends in his first report and promises his support. Tnx, OM. VE3HA, VE3HU, VE3GX and VE3BD are all prospective ORS.

Traffic: Central District — VE3GT 76, VE3EC 20, VE3AD 9, VE3GK 8, VE3DA 5, VE3DW 1. Northern District — VE3HA 64, VE3BD 12, VE3HU 8.

#### QUEBEC DIVISION

**Q**UEBEC — SCM, Alphy, Blais, VE2AC — The principal achievement this month was the A.R.R.L. booth at the Montreal Radio Show. Congratulations to all who took part and made a success of the job and to the organizers: VE2BE, 2AP, 2CA and the XYL, 2HV, 2BD and 2CL, who was the handy-man at the show. A considerable amount of traffic was handled. As by enchantment conditions have become better after such a rotten summer season. Fall and winter promises to be a 'phone season with the following stations on 3.5 and 14-mc. 'phone: VE2AP, 2BE, 2EY, 2HV, 2EV, 2BN, 2HT, 2AV and 2AC. Watch for us Sunday mornings at 10:30 E.S.T. There has never been so much pep in the gang. Our old faithful VE2BB won't complain about rotten conditions next month. Newcomers should get in touch with the SCM as soon as possible. VE2CL had some bad luck with his power supply. VE2CA and the XYL op. are doing fine work. VE2BE keeps working late at night on the xmitter. VE2AP was successful with 14-mc. phone. VE2BG works some DX on 14 mc. VE2EV in St. John is putting in crystal-control phone on 3.5 and 14 mc. VE2BZ handles traffic and keeps busy repairing relays. VE2BJ has several operators working daily and is all set for traffic handling. VE2AC resumes his skeds and intends making the BPL every month. All ORS certificates will become null and void in mid-November. All members desiring ORS appointments must send in their application for nomination. See November QST for full details. We need a few Official Observers for this Division, also Official Broadcast Stations. Amateurs interested should apply to SCM. In the future mention of members' work in this column will be made of those who report on time: 16th of each month. Keep skeds and originate traffic should be your motto for this season. Canadian would-be amateurs who are interested in learning the code please write to the SCM and arrangements will be made to have a few stations on the air giving you special transmissions.

Traffic: VE2BE 35, VE2AP 50, VE2CA 12, VE2BZ 2, VE2AC 28, VE2BB 4.

#### VANALTA DIVISION

**A**LBERTA — SCM, G. F. Barron, VE4EC — Awfully sorry, fellows, for not having the monthly report in QST last month. Have been up North since the first of June and just got back on the 19th of September; therefore did not have time to send in a report. VE4EI is high station as usual. VE4DT is a new station at Glendon. Welcome to our fraternity, OM. VE4EA is experimenting with a pliodynatron and thinks it's FB. VE4BW claims that radio conditions are improving. (Oh Yeah?) VE4GY had his aerial blown down and has erected a new one. After the Canadian Amateur Radio Association's meeting on the 4th of October, VE4HM went home with VE4GT and managed to work a ZL. VE4CU makes his usual "Whoopie" with his 250-watt. VE4EW is a new station using a six-tube transmitter, two 245's, two 224's and two 227's. VE4BJ says "ND" at his shack, but expects to be well away next month. VE4EY, also a new station on the South side, is on with a low power outfit. VE4AF has gone East. We would like to hear from VE4FJ, VE4GM, VE4GD and VE4HC. Let's get the old ball rolling again, gang, and have some real hot reports for next QST.

Traffic: VE4EI 76, VE4DT 9, VE4EC 1.

**BRITISH COLUMBIA** — SCM, J. K. Cavalsky, VE5AL — VE5EC is a new ORS and tops the traffic this month, but the SCM promises him some competition on his next report. VE5CO is trying to eliminate some of the Arc light QRM by using a doublet. VE5DU says he is putting in remote control so as to keep warm during the winter. VE5HP is getting out better now. VE5CB is not on owing to studies. VE5AP has been out of town. VE5DQ says his set won't perk. VE5HP is putting in a motor generator. Conditions in Prince Rupert have been terrible according to VE5GT, who is trying to maintain his sked with Vancouver. VE5DX

and VE5CM of the same city only get on when in port. In Vancouver the gang seem very active and we are pleased to hear a decided improvement in the notes. VE5DR is back again and hopes to get going shortly. VE5AG is making his new tube do its stuff. VE5BP has his set working at last. VE5AL has completed his remodelling and hopes to move some traffic. VE5AN attended the Convention at Sacramento. VE5CF is on occasionally. VE5AC tried 3500 kc., but didn't have very much success, so is back with the rest of the gang. VE5CR is on again after a long rest. VE5AK reports working a few on 14,000. VE5BK is giving his fone a rest. VE5BC is constructing a new receiver which he hopes will solve the problem of his location. VE5DP is a new comer to these parts. VE5DV and VE5CN are the only live ones in New Westminster and would welcome some skeds. Anyone interested in Amateur Radio would have a nice time and hear some interesting lectures if they would visit the club house any Tuesday evening.

Traffic: VE5AC 4, VE5AG 8, VE5AL 10, VE5BP 1, VE5AN 6, VE5DV 5, VE5CN 13, VE5HP 3, VE5EC 56, VE5CE 3, VE5CF 5, VE5DU 5

#### PRAIRIE DIVISION

**M**ANITOBA — SCM, A. V. Chase, VE4HR — The first hamfest of the season held at station VE4DK was a great success. Some of the gang promised to operate on 3.5 mc. in an endeavor to link up with stations in the East in connection with the Canadian Traffic Route. We now have VE4BQ back with us again, recently returned from the West. VE4JB has been busy moving. An A.C. receiver and a crystal-controlled M.O.P.A. xmitter are on the way at VE4FN. VE4BU-W4UM schedule on 14 mc. has been resumed. VE4DJ is keeping schedules with western stations on 7 mc., and is arranging to link up with reliable eastern stations on this and the 3.5-mc. band.

Traffic: VE4DJ 8, VE4BQ 6, VE4BU 5, VE4DK 2, VE4HR 2.

**SASKATCHEWAN** — SCM, W. J. Pickering, VE4FC — Amateur radio activities are on the increase. The number of stations reporting is better, but can still be improved. Drop your SCM a word, gang. VE4IH says his xmitr is in fine shape for the winter. VE4BB has been hrd in England. VE4GR has just finished coaching a new ham, but the Manitoba Section benefits by his moving to Winnipeg. VE4CV sends in his first traffic report and reports two new hams in Swift Current, VE4DI (whose OW is going after her Amateur ticket), and VE4IL. VE4GO will likely be on again with his new power supply when you read this. Another new ham is VE4CC at Shellbrook. If you hear him, gang, give him all the assistance you can. VE4AV and VE4FC were out to visit him just recently. VE4JG has been active as a squirrel climbing poles for the City of Swift Current, tying primaries together which were laid flat by their first blizzard of the season. The OM at VE4EI has been working the odd day hunting chickens (the OG says the feathered variety). Hi! Hi! VE4CT, we are sorry to hear, is leaving to join the VE's in Vancouver. We wish him success in his new position. VE4HL keeps the Sunday ether stirred up and reports wonderful results on 7 mc. VE4CB is expected back on the air shortly with his 852. VE4HY was last heard (of) stuck in the mud at Arcola. VE4AO has changed his place of abode and is busy getting settled. He has a label marked Black and White on his 50 qt. bottle, so listen for the opening (of the station). VE4JS still manages to get the odd QSO and sends his 73.

Traffic: VE4BB 9, VE4GR 6, VE4CV 6, VE4IH 11.

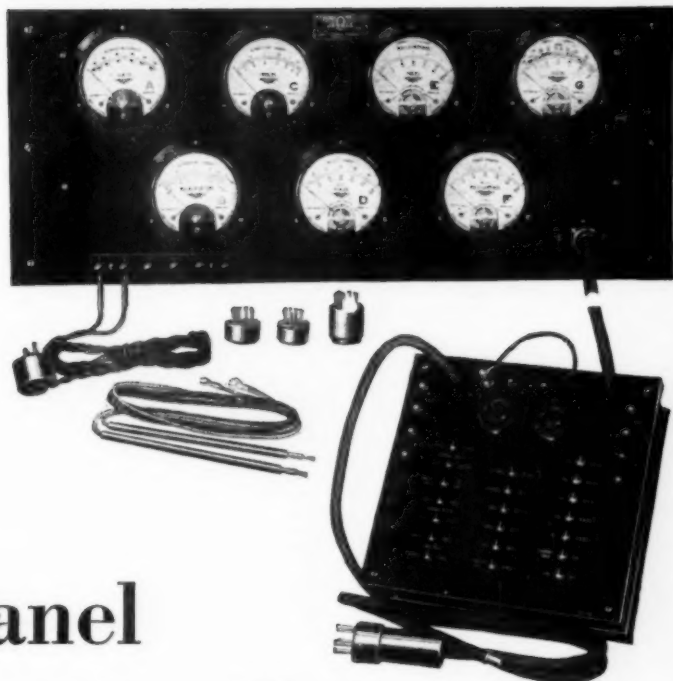
#### LATE AND ADDITIONAL REPORTS

KA1HR handled the usual stack of traffic. OM1TB made the BPL on deliveries. W6TM is on again and schedules KAICE, KA1HR and W6ETJ. Watch his smoke! W1AWE is busy as a Radio Service man.

Traffic: KA1HR 793, OM1TB 87, W6TM 83.

#### TRAFFIC BRIEFS

Why not revive 3500-kc. DX? That band still has DX possibilities even as it had back in 1924 and '25. W8NZ, Battle Creek, Mich., was reported heard QSA5 R6-7, July 5, 1930, on the 3500-kc. band, by W. A. W. Stevens, Hawera, New Zealand, during a QSO with W8CDT at 12:45 a.m. E.S.T. During the past few months a number of fellows have been reported heard in N. Z. Signals travel both ways. Why not try to QSO N. Z. and other DX on 3500-kc.?



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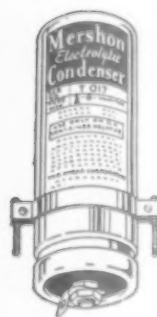
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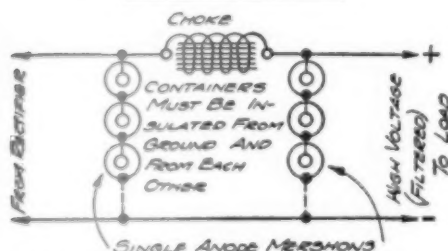
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NDR, Augusta, Maine, says, "Using bank of Merphons put new NDR on the air and got Xtal report first QSO." W1BES says, "Blew a 4,000 volt bank of — condensers before acquiring the Merphons, but have had no trouble since." W1CCP says, "Had 'RAC' report before, but now am getting 'DC' and 'pure DC'." The success of Merphon Condensers is based upon years of development

and actual experience in service. These quotations from the letters of prominent "hams" are typical of the many received in our daily mail.

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has been pleased to place in our ability to control ourselves.

Federal Convention will take place in Melbourne in October, and delegates from every state will be assembled in conference for the best part of a week beginning October 20th. Incidentally, foreign amateurs who happen to visit Australia on any pretext are assured of a welcome if they will communicate with the Headquarters of any Division in the capital cities. The necessary address can be obtained on application to the Radio Inspector at the central post office for the city. Poor conditions continue for DX work, but there are very definite signs that the approaching spring season is ushering in better ones. It is a pity that there are not more DX contacts attempted on the 3.5-mc. band as conditions above 6-mc. are definitely better than below at present.

The 28-mc. band is being systematically explored, and in view of the poor conditions on the other bands, more and more men are being attracted there. VK3CZ had a very interesting QSL from HAF1G, who reported his 27-mc. signals in Austria. He had discovered immediately after the date of the report that he was outside the band, so that the exact indication is excellent proof of the accuracy of the reception.

The Victorian Division is holding an amateur exhibition in September which will be given over to a display of amateur work and equipment. It is planned to have I.A.R.U. Headquarters address us through the coöperation of the commercial 'phone stations and we are hoping that the stunt will come off successfully. I think we will just about gain the record for a local convention "attendance" of the H.Q. gang at a local convention, won't we? (And, as was chronicled in this department last month, the affair was carried out very successfully, although 'phone was not used as proposed. Instead, Pres. Maxim pressed a key and opened the exhibition by means of this signal. — C. B. D.)

Ross Hull has gone back to the United States, and while we feel the loss of such an excellent radio man, we are pleased to think that an Australian should receive the honor of a more attractive and lucrative appointment in America.

## BRITISH NOTES

By J. Clarrieoats, Hon. Sec. R.S.G.B.

The Fifth Annual Convention held in London on September 26th and 27th proved an unqualified success. Some 150 members from the British Isles were present at the various meetings, which were presided over by Mr. Gerald Marcuse. The Convention opened at 6 p.m. on September 26th when the President made his opening speech of welcome. This was followed by the announcement of the election of new District Representatives. Messrs. G. W. Thomas, G5YK, and J. W. Mathews, G6LL, then read a paper entitled "The Progress of 28-mc. Transmission and Reception." This paper is being published in the October issue of the *T. & R. Bulletin*, and can be forwarded to all interested non-members on payment on one shilling.



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# AMERTRAN

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## Equipment

Filament Heating Transformers, Plate Transformers and Radio Filter and Modulation Chokes, designed to meet amateur requirements, are of the same high quality that has made AmerTran products outstanding in a highly competitive field.

Bulletin 1066 gives complete descriptions and diagrams of new equipment. Every amateur should have this informative Bulletin as a guide in ordering new equipment.

**American**

**Transformer**



**Company**

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AMERICAN TRANSFORMER CO.  
172 Emmet St., Newark, N. J.

Please send me Bulletin 1066 containing complete information on AmerTran Transformers, for better radio reception.

Name .....

Address .....

Q. S. T. 12-30

At the conclusion of the meeting, two charabanc parties proceeded to visit the stations owned by Messrs. Mathews and Clarricoats. The Saturday programme commenced with a Delegates Meeting presided over by Mr. H. Bevan Swift (Acting Vice-President). Many important decisions were reached, and recommendations made to the full meeting later in the day.

The usual souvenir photograph was taken just prior to the business meeting.

Mr. Marcuse's first duty at this meeting was to present the Society's trophies, each recipient being greeted with acclamation.

The main business meeting dealt with many matters of local R.S.G.B. and B.E.R.U. interest, chief perhaps (as far as our colonial membership is concerned) was the decision to provide a new coat badge incorporating the letters B.E.R.U. One other very important decision was made which will, we believe, prove of immense interest throughout the world. This is the inauguration of an "Empire Radio Week" when every endeavour will be made to work Empire stations. This week will extend from Sunday, February 22nd, to Saturday, February 28th. Full details will be published shortly; meanwhile, suggestions from Colonial groups will be appreciated.

Convention concluded officially with the annual dinner held at Pinoli's Restaurant, Wardour Street, London. At this event a very great surprise was given to the members by the arrival, direct from Jersey by seaplane, of Miss Barbara Dunn, G6YL. This was the first occasion the OM's of the R.S.G.B. had been given an opportunity of meeting our first and only active YL member at one of our National gatherings. During the evening she was presented by the President with the cup she won in the recent 1.7-mc. tests. A further surprise was provided by the Honorary Secretary. Thanks to generous offers made by British radio manufacturers, he was able to offer over 25 valuable prizes to the persons present. The prizes were "drawn for" by the members and presented by Miss Dunn. Twenty-two firms made contributions. The presence of Mr. Drudge-Coates (ex Y-DCR), Mr. Shrimpton (ZL4AO) and Mr. Le Cheminant (VS7AB) added great interest to the gathering, all three gentlemen giving or responding to the toasts of the evening. Mr. Arthur Watts proposed the toast of the Society Overseas, whilst Mr. H. B. Old welcomed the guests. Mr. Gibbs (representing the *Daily Mail*) responded.

The Society at Home was proposed by Mr. Drudge-Coates and the Honorary Secretary replied.

During the toast speech to the President, given by Mr. Bevan Swift, he presented to Mr. Marcuse a large batch of QSL cards upon which each donor had written "Thanks, OM." as a mark of appreciation for the work he had done on behalf of amateur radio. The final toast of the evening was proposed by Mr. Bevan Swift when he called for all present to show their appreciation of the work carried out by the Honorary Secretary.



Our November issue of "Key-Klix" was mailed to every licensed "Ham" in the country. If you are not on our mailing list send us your name at once. (See "Key-Klix" for our offer of Free QSL Cards)

### He Thought He Would Take the Chance—

Bill, the second op, was just putting the finishing touches on the keying circuit and Jack, the first op, had placed the last power wire in position. "Well, I guess she's about ready to 'perk' now," Bill said. "Yes, looks as if our labors of this past month are beginning to bear fruit. Isn't she a knockout, though?" "Sure enough, but look what it cost you." "Here goes, and may the first QSO be with a foreigner," said Jack as he threw the power switch. Things began to happen. A crackling noise and a thin wisp of smoke seemed to find its way from the middle of the transmitter and Jack literally flew at the power switch and with a wrench that seemed to possess every bit of his anger, sorrow and pathos, disconnected the power from his transformers. But it was too late. "Whew," from Bill, "what happened now?" The words froze on his lips as he noticed the expression on Jack's face. Too often had he heard the sharp staccato cracks of the high voltage breaking through the insulation of his filter condensers. Jack felt downcast. "Happened? The condensers blew out and took the rectifying tubes along with them. There goes a month's work and money." "But how could the condensers blow when they are rated at 2000 volts and the transformer only gives 1500?" Jack looked at him shamefully, "I know that, but I thought I'd take a chance on these condensers—they certainly looked good."

When you come to think of it, did Jack really have to take a chance in buying his radio equipment? He had planned his "superb" transmitter time and again, went over every little detail, end on end. He had spent money on apparatus and bought equipment of a questionable character from a company of questionable name. That is where he made his mistake. Just imagine how much better Jack would have felt if he knew that he was dealing with a company that had been catering to the amateurs for 11 years, practically since the inception of the hobby, and that every piece of apparatus he purchased was unconditionally guaranteed by the seller. The American Sales Company (since 1919) has been supplying the wants of the amateur and has reached the point of being the largest amateur supply house in the country, only through its untiring efforts in dealing squarely with the amateur. Do you have to suffer Jack's fate?

## BARGAINS IN TRANSMITTING EQUIPMENT

### TRANSFORMERS

AMERICAN 2.5 volt transformers—two windings at 11 and 3 amperes. For mercury vapor tubes.....	\$2.75
AMERICAN 3000 volt center-tapped transformers—tapped at 2000 v. Filament windings: 2.5 volts at 10 amps. 7.5 volts at 3.75 amp.....	\$13.00
AMERICAN 4000 volt center-tapped transformers—tapped at 3000 v. Filament windings: 2.5 volts at 10 amps. 7.5 volts at 3.75 amps.....	\$16.50
THORDARSON 175 watt—1150 volts center tapped, two 7.5 and one 3 v. windings.....	\$4.25
THORDARSON 250 watt—1200 volts center tapped, two 7.5 and one 3 v. windings.....	\$5.75
THORDARSON 100 watt—700 volts center tapped, one 5 and one 2.5 v. windings.....	\$3.75
THORDARSON 100 watt—same as above but for use with 25 cycle A.C. current.....	\$4.25

### CHOKES

AMERICAN 30 henri, 300 mil chokes.....	\$9.75
THORDARSON Filter Choke, 30 henri—150 mils. 3000 volts insulation test.....	\$3.25
THORDARSON Double Filter Choke, contains two 18 henri—250 mil chokes.....	\$6.25
AMERTRON Filter Choke, 20 henri—250 mils. D.C. resistance 110 ohms.....	\$10.80
R.C.A. Double Filter Choke—contains two 30 henri—100 mil chokes.....	\$1.75

### CONDENSERS

FLECHTHEIM HIGH TENSION Filter Condensers, with porcelain insulators, guaranteed.	
1500 volts—1 mfd.....	\$2.70
2 mfd.....	5.10
4 mfd.....	8.70
2000 volts—1 mfd.....	9.00
2 mfd.....	15.60

Write for special prices on 3000 volt condensers and type HS & HV.

### CONDENSERS

DUBILIER Filter Condenser, 1.75 mfd., 1000 working voltage D.C.....	\$1.35
DUBILIER Filter Condenser, 7 mfd., 600 working voltage D.C.....	\$2.50
DUBILIER Filter Condenser, 4 mfd., 600 working voltage D.C.....	\$1.80
DUBILIER 11.75 mfd. condenser, 3 mfd. at 1000, 4 mfd. at 600 and 4, 5 and .25 mfd. at 160 working voltage D.C.....	\$3.75
STROMBERG-CARLSON Filter Condenser, 3.5 mfd. at 600 working voltage D.C.....	\$1.50
AEROVOX 7 mfd. Condenser, 2 mfd. at 1000, 2 mfd. at 800 and 3 mfd. at 400 working voltage D.C.....	\$3.00
DUBILIER Plate Stopping Condenser, .000125 mfd. at 1000 volts.....	\$3.35

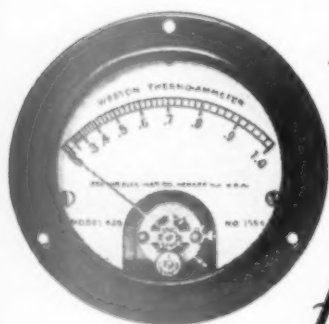
### SPECIALS

BRADLEYSTAT, type E210, current capacity 10 amperes, for transmitters.....	\$9.95
R.C.A. Power Rheostats, will carry up to 2.5 amperes.....	\$4.40
R.C.A. Power Rheostats, (heavy duty) will carry 15 amps., for large tubes.....	\$3.00
CENTRALAB Gain Controls for fone transmitters, 0-250000 ohms.....	\$7.75
AMERICAN 50 watt transmitting sockets, made from heavy bakelite.....	\$2.45
R.E.L. Frequency meters, separate unit for each band, accurate.....	\$15.00
VIBROPLEX new and improved, direct from factory in red, green or blue base.....	\$17.00
WESTINGHOUSE 13600 ohm transmitting grid-leak, 60 watts. Tapped at 6000, 6000 and 1300 ohms.....	\$1.50
AMERICAN 250 watt transmitting sockets, 2 ends.....	\$2.55
UNIVERSAL No. 1089 modulation transformer—200 ohms.....	\$6.85
PILOT SUPER-WASP, D.C. kit, all parts complete for excellent receiver.....	\$29.50
PILOT SUPER-WASP, A.C. kit, practically humless, for short waves.....	\$34.50
PILOT Short Wave Plug in coils, set of five for all bands.....	\$4.95

AMERICAN SALES COMPANY, 21Q Warren St., NEW YORK, N. Y.



# Weston *model* 425 *for* use on *radio* *frequency*



**M**AXIMUM output of any transmitter in short wave work is determined by the radio frequency output as indicated by the milliammeter in the antenna circuit. Naturally the reliability of this measurement is of utmost importance to every operator.

The reliability of Weston instruments is without equal. Their design and quality of workmanship give them the dependability in service that overcomes the exceedingly slight difference in cost which would be offset by less reliable operation.

The Weston Model 425 was designed and developed particularly for short wave work. It is a Thermo-Couple type instrument, accuracy 2%, made as Ammeters, Milliammeters and Thermo-Galvanometers.

The Ammeters, made in ranges of one to twenty amperes, may be used on D.C. or A.C. of any frequency. They have a safe overload capacity of 50%.

The Milliammeters, made in ranges of 125, 250, and 500 milliamperes, are for use on A.C. only. They are ideal for short wave transmission because they have a very low internal resistance, give true current value without any frequency error and do not disturb the constants in the transmitter.

Model 425 is designed for flush panel mounting. In size and appearance, it exactly matches the companion Model 301 D.C. and Model 476 A.C. Voltmeters, being  $3\frac{1}{4}$  inches in diameter.

*For more complete information, write for Circular JJ.*

**Weston Electrical Instrument Corp.**  
602 Frelinghuysen Avenue Newark, N. J.



It is not proposed to deal with other matters in this British report because of the space already taken up with the Fifth Annual Convention, but an attempt will be made next month to remedy this omission.

## NEW ZEALAND REPORT

*By D. Wilkinson, Vice-Pres. N.Z.A.R.T.*

This winter has undoubtedly been the poorest on record in New Zealand for DX. Very little has been done during the months of May, June, July and August on either the 14- or 7-mc. bands. The 14-mc. band has been a complete washout, while 7-mc. has been bothering similarly in that DX signal strength has dropped to almost zero after dusk in the evening.

During the lull most of the stations have been concentrating on 3.5-mc. operation, especially with regard to experimental 'phone, and some excellent results have been obtained. Communication with Australia and distance up to about 2000 miles have been covered with even low-powered outfits. At the same time, however, skip distance has been very noticeable this winter on the 3.5-mc. band in New Zealand, making QSO's within a range of 200 miles very difficult shortly after dark. During the whole year American c.w. and 'phone stations have been regularly received very well for this band, and everything points to a return of the 1924 conditions next year, with international QSO's once again in the vicinity of 80 meters. ZL2BE has already made a number of contacts with W-stations this winter on this band with a power input of 200 watts, and reception of European stations has been reported.

The DX season is now returning, and during the past few weeks several European contacts have been made on the 7-mc. band in spite of the heavy QRM from W-stations in the early evening. Conditions on 14 mc. are still not of the best, but by the beginning of October should return to normal as indicated by past years.

## NORWEGIAN NOTES

*By G. H. Petersen, Pres. N.R.R.L.*

We want to draw attention to the new address of the N.R.R.L. which is Post Box 2253, Oslo. All correspondence for the N.R.R.L. as well as for members of the Board should be sent to this address. We ask you to kindly direct QSL cards to "NRRL-QSL." Correspondence for any Norwegian amateur will be forwarded. This corrects the information given in the I.A.R.U. News for September, 1930.

Activity is fine, judging from latest reports, and conditions on the two principal bands, 7- and 14-mc., are improving. LA1G announces his comeback from a new QRA, and swears by the horizontal Hertz which has brought him QSA 5 reports from all Europe and QSA 3-4 from PY and LU. He is eagerly searching for his old VK and ZL friends now on 14 mc. Other stations report good European results.

We have gotten a temporary permit to operate on 3750 kc., chiefly to arrange for some inland relay tests. These will take place on October 29th

# FROM VOQH - Homeward Bound



OUT of the fastnesses of the Arctic, the staunch little schooner "Effie Morrissey" has again snuggled safely into her berth in home waters.

Her coming was not unheralded, because on September 26th her unfailing and efficient transmitter, out over many leagues of tossing ocean, sent this message →



Ed. Manley, Operator of VOQH, aboard the "Effie Morrissey"



From Pole to Pole, East and West, wherever Radio is known, the good, rugged Cardwell has rendered valiant service under trying conditions.

Your outfit may never be called upon to meet the test of salt water, salt air, extremes of heat and cold, shocks and unavoidable abuse; nevertheless, a transmitter or receiver, if worth building at all, deserves CARDWELLS for efficiency and long service. Send for literature.

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**International Microphone**—Two button for public address systems and transmitters. Speech or music. . . . . \$9.75

**Complete Phone and CW Transmitter** 15 to 30 Watts, \$39.50  
Including tuned plate, tuned grid oscillator with provision for crystal control. Wired for one or two UX 210 tubes. One or two UX 250's as modulators, two stages of speech amplification. Mounted in beautiful two-tone Walnut cabinet. Has ample space for AC power supply. Price includes one Stromberg-Carlson microphone.

**Power Supply unit** for 15 to 30 Watt Transmitter \$19.75. Will deliver 600 volt 150 milliamperes for plate current. Has filament for 281, 210, 250, 227, and 226 tubes.

**World Wide Triple Screen Grid Short Wave Receiver.** A four-tube short wave receiver for the highest efficiency for code, phone and ample output for television experiments. Uses 224 in a R.F. stage, a 224 detector, a 224 resistance coupled audio feeding into a 245 power tube. Tubes used make a minimum of microphonic noises and are so wired to be used on a 6 volt storage battery. A set of 10 plug-in coils are furnished with this set covering from 14 to 550 meters. Other coils can be made to cover lower frequencies. . . . . \$28.50

**World Wide 2 tube Short Wave Receiver.** \$11.75. A two-tube receiver in a beautiful shielded metal cabinet. An ideal all around set which will give loud speaker reception on many stations. Very flexible in tuning. Complete with a set of 6 clip-in coils. Covers 14 to 550 meters. Can be used with any standard base tubes.

**Tubes UX type,** 30 day replacement guarantee. No. 210, \$2.25; No. 250, \$2.35; No. 281, \$1.85; No. 280, 95c; No. 245, \$1.25; No. 224, \$1.25; No. 227, 75c; No. 226, 65c; No. 171, 75c.

**Low Power Transmitter,** adaptable for phone or code. With plug-in Coils. . . . . \$14.75

**Short Wave Sets,** one tube complete with 5 coils, 14 to 550 meters. . . . . \$6.45

**Auto Radio**—Uses 3-224, 2-227 tubes and 1-245 Power tube, single dial, tremendous volume. Compact. Fits any car. We guarantee this set to perform better than sets selling up to \$150. . . . . \$20.00

**Stromberg-Carlson telephone transmitter** on desk stand, \$2.75

**B Eliminator,** Dry, 180 volts, will operate up to 10-tube set, with 280 tube, fully guaranteed. . . . . \$6.75

**250 or 245 Power Condenser Blocks,** 13 Mfd., 1000 volt A. C. test, tapped 2, 2, 2, 4, 1 and 1 mfd., 1 mfd., . . . . . \$4.75

**2 Mfd. Condenser Packs,** 2000 volt A. C. test. . . . . \$7.90

**1500 volt. . . . . \$3.80**

**Double Chokes,** 30 henry each, 160 mils., 1500 vt. test, shielded. . . . . \$4.95

**130 mils. . . . . \$3.75**

**No. 1003 Power Transformers,** shielded, Sec. 600 V. for one 281, one 250, one 227, four 226 tubes and 2 chokes. . . . . \$5.00

**AC-A, B, C, Power Packs,** completely assembled. . . . . \$8.75

**250 V. B. also has A. C. filament** for up to 9-tube set. Can be used as B eliminator. Make your battery set all electric, or build your A. C. set around this pack. 280 tube for this pack, 95c extra.

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Our new Amateur Catalogue, the finest of its kind, containing the most complete line of supplies ever assembled in one catalogue.

Over thirty-five pages of nothing but supplies for the Amateur and short-wave enthusiast. Also sound equipment.

Every manufacturer we represent makes quality merchandise and it is with great pleasure that we can sell you these quality products.

Let us send you a catalogue with our compliments, then your name will be on our mailing list for the future.

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**HALL'S**  
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to November 2nd, and many amateurs are already testing their gear on this wave. Our present permit extends only until the end of November, but all Norwegian transmitters will welcome reports and QSO's in this band, particularly from the more nearby countries, to test the utility of this wavelength for schedules.

## Amateur Radio at the Eastern States Exposition

(Continued from page 19)

forbear to mention the one day when the station was for a short time transformed into an experimental layout, merely in the hope of slightly increasing the already respectable wallop of the signals.

The filter — which, as you will note by turning to pages in November *QST*, consisted of a choke coil and electrolytic condenser in a brute force arrangement — was shorted out. After much reveling of the monitor, micrometric adjustment of the angles of antenna coupling coils, hairbreadth changes in the setting of tuning condensers, and careful plotting of the readings shown on W1LI's antenna milliammeter (on which changes of a very few r.f. milliamperes could be read) the set was eventually put on the air at 6:00 p. m. W3PX was called by Blum, chief op, and worked. The note was reported crystal d.c. QSA 5, and W3PX could not be shaken from that description!

Now for heaven's sake, you fellows who are using similar sets, don't set forth immediately to lay a ten-penny nail or a rusty hairpin across the terminals of your filter on the strength of that report! If you do you'll get a.c. and an application of the Wouff Hong as you deserve — nothing more. It takes four cracker-jack ops and a magic potion to make d.c. out of even particularly well behaved r.a.c.

The station log gives us the following data; twenty-five stations were worked — some of them more than once — in seven districts. This was in five days, as the first and last days the station was not on the air. Inasmuch as traffic handling and not DX or an effort to fill the station log was the end in view, the results were eminently satisfactory. All reports were QSA 4 and 5, and operating was confined to daytimes. While the work wasn't spectacular, consideration of the conditions and the times gives one a lot of respect for the low-powered set.

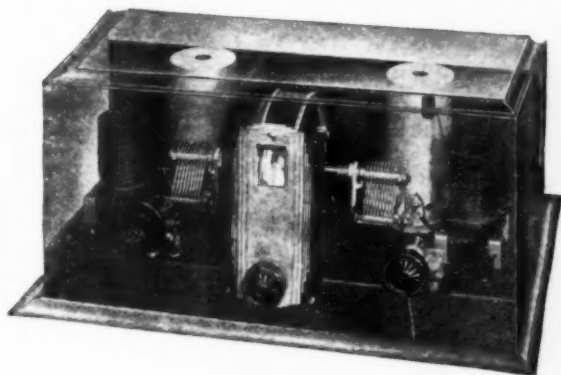
A large number of messages was originated at the booth during the week, a considerable percentage of which passed through W1MK. RP's assistance in disposing of this traffic was invaluable. Many of the messages were of rubber stamp character, but some were of considerable interest. One of the Springfield papers carried a headline to the effect that flat pocketbooks were replenished through the station, a thought derived from messages requesting more cold cash from the home folks with which to meet the exigencies of existence.

The operation of W1ESE was a good example

# The New A. C. Traffic-Tuner

## NATIONAL A.C. THRILL-BOX SW5

Many new features, not previously found, have been developed by NATIONAL CO. Engineers for this remarkable all-purpose, high-frequency receiver — assuring a high degree of trouble-proof operation, a continuous tuning range, equal adaptability to phone or C. W., and absence of hum.



*Equally Effective on Phone or C. W.*



### THE R. F. TRANSFORMERS

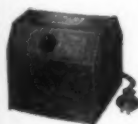
Standard set of four pairs. Covers 21.2 to 2.61 m.c. Special coils available for 33-21.2 m.c. and 2.61-1.5 m.c. ranges. R-39 forms giving low loss with high mechanical stability. Blank forms available for experimental use.



### THE TUNING CONDENSERS

New NATIONAL model SE — special H. F. variable condenser with insulated main bearing and constant impedance pigtail —

270 degree straight line frequency plates. This new design makes gang-tuning possible on short waves.



### THE POWER SUPPLY

A separate and specially designed unit made with filter sections for humless high-frequency operation. 180 volt E, 2.5 volt filament supply. Equipped with cord and soft rubber covered connecting plug.

Licensed under R C A Patents

A MECHANICALLY and electrically stable true A. C. High-Frequency Traffic-Tuner and Receiver for amateur use. Will work with different sorts of antennas without readjustment except of antenna trimmer. Once trimmer is set, Thrill-Box tunes and logs with true single control. Extremely simple to operate. 1080 dial degrees available between 21.2 m.c. and 2.61 m.c. Easily adapted to still wider spreading of bands, if desired. Works down to 33 m.c. Very smooth sensitivity control, no grunting, no back-lash, or clicking on higher frequencies. No hand capacity. DOUBLE SCREEN GRID, with 224 grid-leak detection. Push-pull audio, with special phone-jack before the last stage.

*See Description of Transformers, Condensers and Power-Supply at left*

Also made in new Low-drain D. C. Model, using 230, 231 and 232 tubes. Easily assembled with genuine NATIONAL Radio Parts.

*Write today for Amateur Bulletin No. 141-Q12*

# NATIONAL

RADIO PARTS

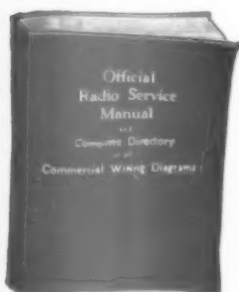


NATIONAL COMPANY, INCORPORATED, MALDEN, MASS.

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**Hugo Gernsback, Editor  
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*Everything for the Amateur  
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of the splendid efficacy of low-power under present conditions. That matter has been tested and proved to our full satisfaction!

### WHAT IT'S ALL ABOUT

And that was triumph indeed. In fact, there were many such triumphs which were overshadowed by the principal objects of this coöperation. The new interest aroused in old-timers now out of the game was another. But the important ends we sought were equally successful. As an experiment in a new field it was productive of results and a fund of experience for future workers.

By this we do not mean to-day that the operation of a small amateur station in a booth at a show or exposition is a new experiment. But the second great purpose, that of instituting and training a class of selected boys in the principles and possibilities of amateur radio, is both new and, as we have proven, worthwhile.

There is a wonderful opportunity awaiting all of us in the advocating and assisting in work of this sort among boy's clubs and boys as individuals in our vicinities. This has a universal application and is not confined alone to Junior Achievement clubs, but if you have a J.A. club in your vicinity it gives many opportunities for leadership to those trained in or having hobby experience with any of its programs. Those of you who have inclination and ability for such work will gladly be given an opportunity to discuss any angles of it, or have any questions answered, by writing in to Headquarters.

It seems to us that the club plan is one particularly applicable to beginning amateurs. It results in an initial pooling of effort and expense, as well as the profit and pleasure which results. Eventually, of course, each budding club-member-amateur will have his own station on the air, but during the period while he is learning the principles of amateur radio his activities are controlled and guarded sufficiently so he will not be creating unnecessary interference, or becoming any of the other numerous sore spots beginners so readily become.

From the time he first learns the letter "A" of the code until a sufficiently long time has elapsed since the issuance of his license, he works with help and supervision in the quickest, most efficient way. He always has guidance and counsel when it is most needed, and his mistakes are thereby reduced to a minimum. This means more enjoyment for him in the successful application of his new hobby, and safeguards the interests of other amateurs who might be affected by any prolonged bungling on his part.

This pooling of effort is not only advantageous to the beginner; it represents real economy in the use of our restricted frequency allocations. And the result is new strength to amateur radio.

The system used in training this class of boys was a comparatively simple one, and can be organized by any one with very little effort. Time was allowed for six code lessons, so the alphabet and numerals were divided into five lessons, leaving the last open for abbreviations and extra

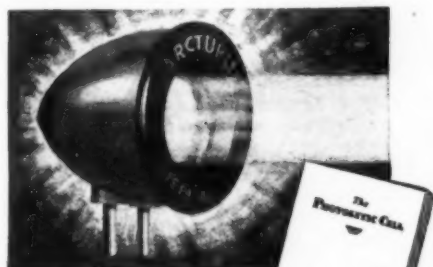
**1.** The Vitrohm Plaque Resistor, non-inductive and non-capacitive, is ready. Standard resistance value 5000 ohms, handles the grid of a 50 watt and the price is only \$2.00. Get the dope today.

**2.** If you haven't received your supply of the snappy new Q.S.L. cards, write for them today. Your call letters will be imprinted in outline letters. There is no obligation for this service.

**1. new!**  
**2. free!**  
**3. ??????!**

**3.** We have a very important matter to discuss with Radio Club Secretaries. Write at once giving the name of your organization and number of members. *Club Members* — if your secretary misses this, tell him to drop us a line.

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**PHOTOLYTIC CELL**  
*The Electric Eye for Every Industry*

MADE BY THE MAKERS OF ARCTURUS BLUE TUBES

## POWERTYPE CRYSTALS

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and Dealers



**THE STANDARD OF COMPARISON**  
POWERTYPE crystals are recognized as the best.

No off frequency operation with  
POWERTYPE CRYSTALS

### FULLY GUARANTEED BY A RELIABLE COMPANY

Ground by experts and calibrated from precision standards. Crystals for amateurs ground to approximate frequency and calibrated to better than 1/10 of 1%.

1715-2000 kilocycle band .....	\$10.00
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One inch oscillating blanks .....	4.00
Plug-in dust proof mounting as illustrated above .....	6.00

550-1500 kilocycle band — calibrated at any temperature plus or minus 500 cycles desired frequency complete with plug-in dust proof mounting — \$45.00. Constant temperature heater oven less crystals \$150.00. We do any kind of special crystal grinding for any frequency.

Grinding instructions furnished with crystal blanks.  
You may order direct from this ad C.O.D.

**FREE** Send name, no obligation, for full information on crystals, holders, blanks, heater ovens, etc.

"CLEAR AS A CRYSTAL"

**AMERICAN PIEZO SUPPLY COMPANY**  
1101 Huron Building Kansas City, Kansas  
Specialists in frequency precision

## Xmas Specials

**DONGAN POWER TRANSFORMERS.** 250 Watt. With ballast tube in primary to keep voltage steady, output is 1500 CT, 7½ CT, 2½ CT, 7½ and 15 Volts. Without ballast tube output is 2000 CT, 10 CT, 3 CT, 10 and 20 Volts. Neat black metal case with terminal board, 15 lbs. .... \$5.25  
Special Ballast Tube..... \$1.00

**THORDARSON — POWER TRANSFORMERS:** 250 Watt. 1200, 7½, 7½ and 3 ..... \$5.75  
175 Watt. 1125, 7½, 7½ and 3 — \$4.25. 150 Watt. 800 and 5. (All windings center-tapped) ..... \$3.00  
Double Choke, Each section 18 Henry, 250 MA. .... \$6.25  
Single Choke, 30 Henry, 150 MA. .... \$3.25

**W.E. HAND MICROPHONES.** Very sensitive. Switch in handle. Ideal for home recording, transmitters, etc. .... \$3.95

**PARCON FILTER CONDENSERS.** Highest grade. Neat metal cases with novel stand-off insulators. Guaranteed.

DC Working Voltage	1 Mfd.	2 Mfd.	4 Mfd.
2000 Volts	\$3.95	\$6.95	\$12.45
1500 "	3.00	4.50	7.95
1000 "	1.50	2.30	3.60
650 "	1.05	1.70	2.90

**SPECIAL .002 MFD., 2250 Volt (Wkg.) Mica Condensers.** \$1.05

**PARADON 3½ MFD. BLOCKS.** Contains 1½ Mfd., 1000 Volt, and 2 Mfd., 600 Volt (DC Working). Neat black case. Ideal for 210 filter. Six for \$7.25. Each ..... \$1.45

**2 MFD. 1000 VOLT FILTER CONDENSERS.** Uncased. Highest grade. A quantity may be series-paralleled for any desired voltage and capacity. 85c each. Four for \$3.20. Eight for \$6.00. Twelve for \$8.20. Twenty for \$12.50.

**SANGAMO 5000 Volt Test Condensers.** .002, .001, .0005, .00025 Mfd. .... \$1.20

**DUBILIER .002 MFD., 6000 VOLT WORKING MICA CONDENSERS.** ..... \$1.95

**IMPORTED FRENCH PHONES.** 4000 ohms. Sensitive. .... \$1.75

**GUARANTEED TUBES — 60-Day FREE Replacement.**

UX-210 \$3.75, UX-250 \$3.95, UX-281 \$2.75, UY-224 \$1.65, UX-245 \$1.00, UX-112-A \$1.65, UX-280 85c, UY-227 \$1.10, UX-171-A \$1.35, UX-226 \$1.05, UX-201-A 85c. For those who prefer a lower priced tube of good quality we offer the following with a 5-Day replacement guarantee. UX-250 \$2.10, UX-210 \$2.00, UX-281 \$1.50, UX-245 70c, UX-280 70c, UY-227 70c, UY-224 \$1.05, UX-226 65c, UX-171-A 75c.

**H & H Toggle Switches or Beaver 3 Amp. 125 Volt Snap Switches** 20c each. Per doz. .... \$1.75  
**Mahogany Bakelite Knobs.** 1½" 7c each. Doz. .... 75c

**Complete Lines and Lowest Prices on**  
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### QUARTZ OSCILLATING CRYSTALS

**POWER CRYSTALS — Guaranteed — easy oscillators.** One-inch square sections ground to your approximate specified frequency which is stated with a precision of one-tenth of one percent.

3500-4000 Kc. band	\$7.50
7000-7300 Kc. band	12.00
One-inch oscillating blanks	3.00

Orders will be filled within twenty-four hours after they are received.

**PRECISION PIEZO SERVICE**  
427 Asia Street Baton Rouge, La.

## P A C E N T

### Duo Lateral COILS

Radio engineers and laboratories with real records of accomplishment use Pacent Duo Lateral Coils. They come in all standard turn ratios.



Write for information  
and prices

**PACENT ELECTRIC CO., INC.**  
91 Seventh Avenue New York City

practice. A half hour each day was devoted to drilling on the selected group of letters during each of the first four days, with constant review and the insertion of words and sentences to create and hold interest. On the last two days 45-minute sessions were held, to wind the lessons up properly.

After Mr. Hebert's speech on Monday, which dealt with amateur radio in general terms, the balance of the week was given over to the consideration of the following units (one each day) as has been mentioned before.

1. The background and tenets of existence of amateur radio, with a review of activities, history and character. Regulations, frequency bands, etc., were explained.

2. The receiver, dealing with practice, construction and elementary theory. For this demonstration the two-tube set shown in the foreground of two pictures was used.

3. The transmitter, with the same points brought out as above, including an explanation of the theory of oscillatory circuits, and the operating theory of rectifier-filter power supply systems. The single-control set and the WIESE transmitter were used in this lesson for purposes of illustration.

4. Elementary radio theory, of the practical nature permitting understanding of the principles underlying design of capacity-inductance values, antenna lengths, etc.

5. Operating practice, using WIESE as an object lesson.

It's all very easy. And yet, with a little application on the part of instructor and student, it is absolutely amazing the amount of practical amateur radio knowledge gathered by a young fellow who, when he starts, thinks UX-210 is a chemical formula. Try it with the non-radio boy's clubs in your locality, organizing a special radio class or subsidiary of your regular radio club. It is one of the most worthwhile things you can do and is also a lot of fun.

For help of any kind write in to Headquarters. We have a special booklet (*How To Become a Radio Amateur*) prepared to simplify and standardize such training, and they will be gladly supplied at 10¢ each or \$1.00 a dozen. Organized beginner's amateur radio clubs represent the solution of one of our toughest problems. Let's get them going.

## Strays

If no suitable brackets are available for mounting miget condensers in a readboard layout the ones used for holding window shades will serve very nicely. The necessary holes are already drilled. — W3CA.

W5WN suggests that the panel saw in the July "X" Section can be made to cut circles if the back of the hack-saw blade is cut off with a pair of tin snips. The blades are generally highly tempered only on the side that carries the teeth, the other side being left soft to prevent breakage.

## Two Way Radio Link Never Interrupted — Capt. Yancey's Radio Makes New Records —

### Here's the Story behind These Headlines

The Yancey plane (ESCO equipped) in its non-stop flight to Bermuda maintained direct two way communication with New York. Darkness forced the plane down a little short of its goal. The plane floating on the sea remained in communication with New York.

Later, on its "Good Will" flight to South America the Yancey plane, on the ground at the Canal Zone, maintained two way communication with New York. Zeh Bouck, Radio Operator, said—"I believe this is without doubt a record for Airplane transmission, and it shows very clearly what we could have done had we been forced down in some of the jungle over which we have flown during the last few weeks."

**And on July 1, this last record was broken — the Yancey plane, on the ground at Buenos Aires, communicated uninterruptedly for more than an hour with the New York Times Station, 5838 miles away.**

The Yancey plane was equipped with an "ESCO" wind driven generator to supply radio power while flying, and a battery operated "ESCO" dynamotor for ground work.

"ESCO" has a very complete line of wind driven generators, and dynamotors for airplane service. Let "ESCO" Engineers help you with your power supply for communications.



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General Electric 24/750-volt 150-watt Dynamotors. \$27.50  
General Electric 24/1500-volt 350-watt Dynamotors. 37.50  
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Westinghouse 6-15 volt 500-watt. 15.00  
Westinghouse 200-watt 900-cycle. 25.00  
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Twins for double voltage or current. 15.00  
Shafts for external drive \$3.00 additional

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53 Walker St New York  
**FREE CATALOGUE**  
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WRITE TO-DAY



## YOUR A.R.R.L. EMBLEM

The League Emblem comes in four different forms. Its use by Members is endorsed and encouraged by the League. Every Member should be proud to display the insignia of his organization in every possible way.

**THE PERSONAL EMBLEM.** A handsome creation in extra-heavy rolled gold and black enamel,  $\frac{1}{2}$ " high, supplied in lapel button or pin-back style. The personal emblem has come to be known as the sign of a good amateur. It identifies you — in the radio store, at the radio club, on the street, traveling — you can spot an amateur by it. Wear your emblem, OM, and take your proper place in the radio fraternity. Either style emblem, \$1.00, postpaid.

**THE AUTOMOBILE EMBLEM.** 5 x 2  $\frac{1}{4}$ ", heavily enameled in yellow and black on sheet metal, holes top and bottom, 50c each, postpaid.

**THE EMBLEM CUT.** A mounted printing electrotpe, the same size as the personal emblem, for use by Members on amateur printed matter, letterheads, cards, etc. \$1.00 each, postpaid.

**THE "JUMBO" EMBLEM.** How about the shack wall or that 100-footer? Think of the attention this big yellow-and-black enamel metal emblem will get! 19 x 8  $\frac{1}{4}$ ", same style as Automobile Emblem. \$1.25 each, postpaid.

**The American Radio Relay League, Hartford, Conn.**



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If we are not already represented in your locality  
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our regular engineers, until such time as you can qualify.  
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Our service is avail-  
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sound men is avail-  
able to service and in-  
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FIRE DEPARTMENT RED

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(City and State)

## Who's Who

(Continued from page 28)

Francisco, and continuing successively with  
Standard Electric Co. of California, California  
Central Gas & Electric Co., and the North Shore  
Railroad. In 1903 he became the electrical en-  
gineer of the Harriman Lines, in 1909 electrical  
engineer for the Southern Pacific Co. Since 1912  
he has been Consulting Electrical Engineer for  
that company.

Mr. Babcock's participation in general techni-  
cal activities has been impressive. He is a Fellow  
and a past vice-president of the American In-  
stitute of Electrical Engineers, member and past  
president of the Engineers' Club of San Francisco.  
He is a member of the American Association for  
the Advancement of Science and of the Astronom-  
ical Society of the Pacific. In 1924 he represented  
the United States as principal delegate to the  
Inter-American Electrical Communications Con-  
ference, held in Mexico City. He is an honorary  
member of *La Sociedad Geografica y Estadistica*  
(Mexico). He is a representative of affiliate  
membership in the Society of Automotive En-  
gineers.

Always of distinctly nautical leanings, Mr.  
Babcock holds a commission as Lieutenant-  
Commander in the U. S. Naval Reserve and has  
had several lengthy cruises with the fleet in active  
duty. He is an expert amateur navigator, yachta-  
man and fisherman, and a member of the San  
Francisco Yacht Club and the Berkeley Country  
Club.

In amateur radio he has been equally active.  
He pounds brass pretty steadily at W6ZD,  
particularly with Hawaii. Most of his radio  
efforts, though, necessarily go to his duties as  
Division Director. He is a vigorous director,  
keeping closely in touch with affairs through the  
large Pacific Division, maintaining an extensive  
correspondence, and frequently visiting the  
larger centers in person, particularly at the time  
of conventions and hamfests. Not *The Old Man*,  
he is yet one of the elders in the League, both in  
years and in counsel.

## The Roanoke Division Con- vention

WITH real Southern hospitality the Rich-  
mond Short Wave Club, through its  
chairman, "Bob" Eubank, welcomed the  
delegates attending the first Virginia A.R.R.L.  
Convention at the Hotel Richmond, Richmond,  
Virginia on September 19th and 20th. The largest  
registration was the first day and every minute  
was taken up with something worthwhile.

The "dutch" lunch at noon on Friday enabled  
those present to get acquainted and kept the  
crowd together so that when the afternoon meet-  
ing was called to order the Winter Garden room  
was well filled with an enthusiastic crowd. Chair-  
man Eubank introduced Director Gravely  
W3BZ, one of the real old timers; one who has

# QST Oscillating Crystals

## "THE STANDARD OF COMPARISON"

### AMATEUR BANDS:

Winter is coming, and no doubt you are going over your transmitter removing those weak links so as to get the most possible efficiency from your set.

One item of great importance is the frequency stability of your set. Does it stay on one frequency? If not, our power crystals will solve that problem. SCIENTIFIC RADIO SERVICE crystals are known to be the best obtainable, having ONE single frequency and highest output. With each crystal is furnished an accurate calibration guaranteed to better than a tenth of 1%. New prices for grinding power crystals in the amateur bands are as follows:

1715 to 2000 Kc band. . . . . \$15.00 (unmounted)  
3500 to 4000 Kc band. . . . . \$20.00 (unmounted)  
7000 to 7300 Kc band. . . . . \$40.00 (unmounted)

### BROADCAST BAND:

Power crystals ground in the 550-1500 Kc band accurate to plus or minus 500 cycles of your specified frequency fully mounted for \$55.00. In ordering please specify type tube, plate voltage and operating

temperature. All crystals absolutely guaranteed regards to output and frequency and delivery can be made within two days after receipt of your order.

### CONSTANT TEMPERATURE HEATER UNITS:

We can supply heater units guaranteed to keep the temperature of the crystals constant to better than a tenth of 1 degree centigrade for \$300.00. Two matched crystals, ground to your assigned frequency in the 550-1500 Kc band with the heater unit complete \$410.00. More detailed description of this unit sent upon request.

### ATTENTION AIRCRAFT AND COMMERCIAL RADIO CORPORATIONS:

We invite your inquiries regarding your crystal needs for Radio use. We will be glad to quote special prices for POWER crystals in quantity lots. We have been grinding power crystals for over seven years, being pioneers in this specialized field, we feel we can be of real service to you. We can grind power crystals to your specified frequency accurate to plus or minus .03%. All crystals guaranteed and prompt deliveries can be made. A trial will convince you.

## SCIENTIFIC RADIO SERVICE

### "THE CRYSTAL SPECIALISTS"

P. O. Box 86

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### ALUMINUM BOX SHIELDS

Beautiful Silver Dip Finish Any Size to Order  
Monitor Size 10" x 6" x 7" high. . . . . \$3.25  
Stage Shields 9" x 5" x 6" high. . . . . 1.89  
Knock Down Coil Shields, 5" x 5" x 5", special. . . . . 1.00  
1 1/2" plug-in forms, 44 grooves to the inch, UX or UV. . . . . 49c.  
Meco Telegraph Key 99c. Sprague 25 Condensers 59c.  
Phosphor bronze drum dial cable by foot or mile.  
Bakelite 50 watt sockets. . . . . \$2.95  
.001 Variable Condenser. \$1.25. Please include postage.  
BLAN, THE RADIO MAN, INC.  
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### FIRST QUALITY QUARTZ CRYSTALS

Scientifically Prepared for Maximum Power and Unconditionally Guaranteed 1 in. square sections, (close to your specified frequency), supplied promptly at the following prices:

40-75 meters. . . . . \$20.00  
75-100 meters. . . . . 12.50  
100-200 meters. . . . . 9.00  
200-600 meters. . . . . 15.00  
1 in. Tested blanks, 200-400, 400-600 meters. . . . . 4.00  
Dustproof Bakelite mounts. . . . . 3.00

(A Calibration furnished with each crystal)  
Sections of any practicable dimensions made to order  
(Charges for grinding to exact frequencies given on request)

J. T. Rooney, B. Sc., 4 Calumet Bldg., Buffalo, New York

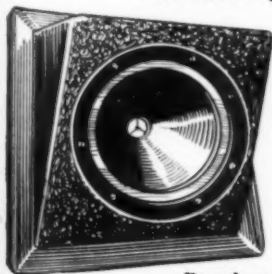
"A pioneer crystal grinder"

## YOUR GOLDEN OPPORTUNITY!

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BRAND-NEW

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Brand new in original cases. Field Supply for 110 V. AC Operation. \$6.50 extra.



12-Inch DYNAMIC SPEAKERS

Regular Price \$110.00 Our Price

Standard 12" speakers mounted on cast iron panels. Operate on a field of 110 V. DC, 1000 ohms with 100 mill. drain.

\$15

Terms: 25% with order

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## Maximum Power Crystal Blanks

Bethesda crystal blanks are tested for maximum power and output, and are unconditionally guaranteed to be free from any and all defects.

Price of zero angle or x cut blanks ground to within 1/1000 of an inch in thickness of the

50 to 500 meter band	\$4.25 per section
500 to 700 meter band	\$4.50 per section
40 meter band	\$6.00 per section
20 meter band	\$7.00 per section

Blanks on the Vyr 30° angle plane to within 1/1000 of an inch in thickness of the 80 or 160 meter bands, \$4.25 per section. — Prices include postage and are C.O.D. or cash with order. — Special quotations to Dealers, and on orders of 5 or more blanks. — Crystal sections on hand, or cut to order in any shape, size, or plane, for Laboratory or Basic science research work for Universities. A trial order will convince you of the high standard of our product. Special attention given every order.

BETHESDA CRYSTAL LABORATORY

**P. O. Box 43**

Bethesda, Md.

represented his division so well for many years. Mr. Gravely spoke on the duties of the director and what it means to one to have the constructive cooperation of the members; he then introduced Mr. Chas. H. Stewart, Vice-President of the A.R.R.L., who has looked after the legislative end of the League so efficiently for a long time. Mr. Stewart said he was present to enjoy himself as a "ham" and intended to do so all through the convention and before the convention was over was made a member of the "young squirt" family by Doc. Woodruff, the "Sherlock Holmes" of the Board of Directors. (The young squirt family now consists of Gravely, Stewart and Hebert.) Major W. G. Hawthorne, U. S. Marine Corps, Quantico, Va., and one of the active "hams" in the division under the call-letters of W3AFT, gave a talk on the equipment used by the signal section of the Marines and showed some of the portable transmitters and receivers used in the field. The compactness and ruggedness of the outfits showed careful design and manufacturing. Thanks are due the Major for all his trouble. Fieldman Hebert from Headquarters had brought Ed. Handy's new Dynatron Frequency Meter and did his best to convince the gang of the importance of each amateur station having an accurate measuring instrument. The importance of keeping within our frequency bands cannot be overlooked any more. Mr. M. M. Brisbane, Service Engineer, RCA-Victor, gave a lecture on condenser microphones as used in broadcasting stations. The afternoon ended with Lieut. Wilson, U.S.N.R. showing three reels of movies. Dinner found group after group of fellows who had become real friends together and the air buzzing with ham-talk.

The evening was devoted entirely to an illustrated lecture by L. S. Fox, Engineer, National Carbon Co., on tube construction, and made one appreciate the amount of research work conducted by his firm.

The traffic meeting on Saturday morning was in charge of SCM, J. F. Wohlford, W3CA, and general discussions on Communications Department affairs took place. Lieut. Wilson, U.S.N.R. brought out the benefits to be derived in enrolling in the Reserve, which remarks were supplemented later by Lieut. E. C. Rogers of the Navy. Capt. N. L. Baldwin, the Army-Amateur Liaison Officer from Washington, discussed the importance of the Army-Amateur net now being placed on an efficient basis and with a master control station (WLM and W3CXL) located in Washington. Our fellows should realize more and more the importance of these two services and extend full cooperation. Don Lusk, although an SCM for the Atlantic Division was present with his OW, and that brings to mind there were several OW's and YL's present.

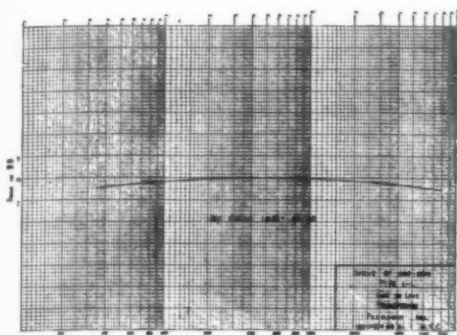
The convention was favored by two representatives from the Radio Division in the persons of Mr. L. C. Herndon, Radio Supervisor and his assistant Mr. G. E. Sterling, of the third district. They were kept busy with examinations.

With some 25 automobiles in the line — looking just like a parade — a trip was made to the



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Now made in U. S. A. on 48hrs. notice



Curve of 600 OHM Type L. L. Transformer—  
Tube line to line

Ferranti specially designed precision audio and output transformers suitable for the exacting requirements of broadcast stations, laboratories, recording devices, amplifiers, telephone lines, special testing and other uses, where a flat curve is required over a wide frequency range, are now made in the U. S. A.

These transformers have curves flat within less than 1 db. between 35 and 8000 cycles. The above curve of 600 ohm line to line transformer is typical. Transformers of this class can be furnished for tube to line, line to speaker, line to line, line to tube, microphone to tube and other numerous requirements.

**FERRANTI, INC.**

130 WEST 42nd ST., NEW YORK



**And now  
Ellis Model 10N  
for Amateur  
Radiophone!**

The Ellis Model 10N Microphone at \$25.00 list is something entirely new in microphones at this price. By means of a special gold plated corrugated metal diaphragm developed at our laboratory we have attained many of the advantages of the stretched metal diaphragm. Your jobber can secure this for you if he does not have it in stock. Write for details of mechanical and electrical characteristics.

**ELLIS ELECTRICAL LABORATORY**

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**RADIO SERVICEMEN**

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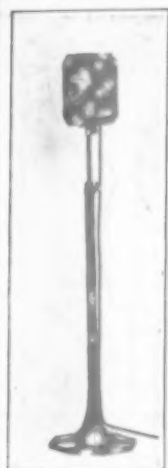
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## NEW!!

Our model 30 line of Condenser Microphones using the new low drain tubes. Elaborate two stage amplifier. 6 or 12 V. filament operation. Priced up to \$250.00.

### COLOR!

Pine tree ripple finish in black, black and gold, black and silver, brown, brown and gold.

### SIGNAL LIGHTS

Wired in red and green signal lights.

### UNIT

Our new and improved type "B" Unit with a sealed-in chemical dryer. Sold separately.

**\$100.00**

Microphone comes with tubes and 30 ft. 7 wire Packard shielded cable.

DEALERS WRITE  
FOR PROPOSITION

## ASTATIC MICROPHONE LABORATORY

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On the West Coast

PACIFIC ENGINEERING LABORATORY CO

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## A Larger Rectobulb TYPE R4

### Now Ready

Fil. Volts 5

Fil. Amps. 10

Peak  
Current  
2.5 Amps.

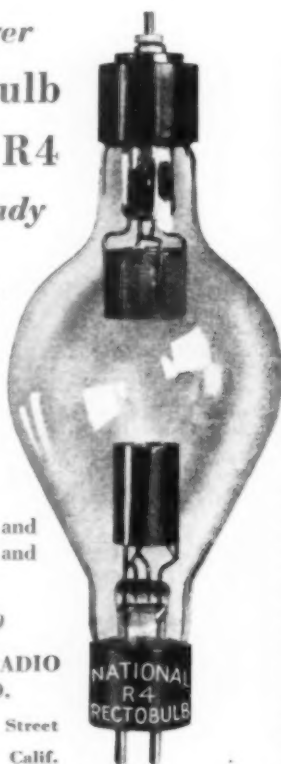
Max. Inv.  
Peak Volts  
7000

Fits UX socket and  
has plate cap and  
connection.

Price \$20

NATIONAL RADIO  
TUBE CO.

3420 Eighteenth Street  
San Francisco, Calif.



air-port where an opportunity was given to examine the Department of Commerce radio beacon and weather station, followed with a visit to Broadcasting Station WRVA, where "Bob" Eubank is the chief operator. The final technical talk took place in the Red Room while the Winter Garden was being prepared for the banquet. Miss Elizabeth M. Zandonini, (our own W3CDQ) from the Radio Division Bureau of Standards, gave an illustrated lecture on the piezo-electric oscillators as used by the Bureau. We are thankful to Dr. Dellinger for permitting Miss Zandonini to bring slides along — for they always help a lecture. There were so many speakers that Doc. Woodruff, W8CMP, did not have an opportunity to speak on "chokes" until the banquet, but as he was the "Roastmaster" he found a chance to give a bully good talk. With a good orchestra and a side "skit" by two pickaninnies the entertainment feature was well carried out during the banquet. With the distribution of prizes as a finale the first Virginia convention came to a close with the gratitude of all present being expressed to the Radio Manufacturers for their donations and to the Richmond Short Wave Club and the convention committee for such a pleasant affair.

— A. A. H.

## Who's Who

(Continued from page 28)

by c.w. Followed a half dozen very active years, during which Mr. Huber was president of the Tipton Radio Club and held a variety of A.R.R.L. positions: O.R.S., O.W.L.S., O.B.S., member X-Section, R.C.C., Asst. Division News Manager, and S.C.M. for Iowa.

These activities and qualifications caused him to be called to headquarters in the spring of 1928 to become Assistant to the Communications Manager. He put in a year and a half at Hartford but felt obliged in 1929 to return home to resume his studies at the University of Iowa, which had been interrupted by the sojourn at headquarters. Brasspounding was now divided between W9YA, the University station, and W9DOA, which had become crystal-controlled in 1927. In the fall of 1929 Mr. Huber was elected director of the Midwest Division, and has represented them this year. He was commissioned Ensign in the U. S. Naval Reserve and appointed executive officer for Section Eight (Iowa) of the naval communications reserve. Meanwhile he continued active in club work, organizing the Iowa Amateur Radio Club at the university's seat, Iowa City, and having a good share in planning several of the conventions at Ames, annual Midwest Division affairs.

This fall he transferred his activities to Seattle in order to enroll in the School of Journalism at the University of Washington. His unfortunate distance from his division made it seem desirable to him to resign his post as director, as a consequence of which a special election is now in process to choose his successor in the Midwest. Meanwhile he maintains his interest in amateur matters and has become a member of the Seattle Radio Club.

Say You Saw It in QST — It Identifies You and Helps QST

# REPLACEMENT TRANSFORMERS

by

## THORDARSON

R-101

Replacement  
Input  
Transformers

for push-pull  
tubes in output  
stage



T-2971-E T-3381

Replacement Power Transformers

T-3381 for single "171" tube in  
output stage.

T-2971-E for "171" push-pull tubes  
in output stage.



Thordarson Electric Mfg. Co., Huron, Kingsbury and Larrabee Sts., Chicago, Ill.

### Install Tone Quality

in unsatisfactory sets by replacing inferior, obsolete, or worn out units with THORDARSON REPLACEMENT TRANSFORMERS ... it is what the set owner hears ... the improvements in audio amplification ... that makes pleased customers.

THORDARSON Replacement Transformers are constructed according to the true high standards set by all THORDARSON apparatus ... and they are almost universal in application.

A small stock of THORDARSON Replacement Transformers enables you to recondition a wide variety of sets, with minimum investment in stock. For sale at all good Parts Dealers everywhere.

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Transformer Specialists Since 1895

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Write now for free booklet on "Opportunities in Radio."



WEST SIDE YMCA RADIO INSTITUTE  
111 West 64th Street, New York Established 1910

## We Beg Pardon

Due to the unexpected demands for our new products, shipments were somewhat delayed. However, we have now increased our facilities and shipments of our type WM-1 wavemeter and type MM-1 Monitor can be made immediately. We thank our customers for their patience.

**Type WM-1 Wavemeter:** Aluminum case, large micro-vernier dial, readings to 1/200 of full scale, neon bulb resonance indicator, coils for 20, 40 and 80 meter bands. Fully calibrated, with graphs. .... \$9.50

**Type MM-1 Monitor:** Aluminum case, micro-vernier dial, coils for 20, 40 and 80 meter bands. Complete with tube and batteries. .... \$12.50

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PORT ARTHUR COLLEGE

PORT ARTHUR (world-known port) TEXAS

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Sights, Good Pay  
and Comfortable Living . . .  
Abundant Leisure for Study.

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## for phones or C. W.

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Get that 1931 pure D.C. note and laugh at QRN. Send us your order today and build your new station around this wonderful unit. Uses two 281s as rectifiers, or mercury filled rectobulbs.

Supplies both filament and plate current for four 210 tubes. Priced for less than you can buy the parts to build it.

**Price \$25.00**

without tubes

Special Deluxe for phone, nickel plated **\$30.00**

Monitors to match complete **\$7.50**



**GENERAL ENGINEERING CORP.**  
CHARLOTTE MICHIGAN

## Changes in Regulations

(Continued from page 30)

accordance with the Radio Act of 1927 as amended." The practical effect of this is to take out of the hands of the Supervisors of Radio the actual licensing of amateur stations and to centralize this work for the whole country at the offices of the Commission in Washington. General Saltzman, chairman of the Commission, explains in a letter printed in this month's "Correspondence" that the duty of issuing amateur licenses belongs to the Commission, under the law, and has been but temporarily handled by the Radio Division. The Commission now possessing adequate facilities for doing the work, it now takes it over, as provided in the Radio Act.

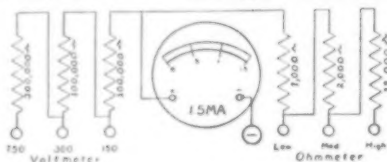
The regulations of course continue to provide that normal amateur applications complying with the regulations shall be issued without more ado, and at this writing the issuing and renewal of station licenses is proceeding smoothly and promptly at Washington.

Application blanks must still be obtained from the Supervisor, and the filled-in form must still be filed with the Supervisor. It is not to be mailed direct to the Commission. (The Supervisors still issue operator's licenses.) In the past the greatest delay in issuing amateur licenses has been caused by the improper or incomplete execution of the application form. Supervisors have often had to return an amateur's application for correction or to secure missing data. With the forms now going to Washington, such delays will be greater. It is important, then, to make an adequate answer to each question.

Applications for renewal of station license must be filed with the Supervisor at least thirty days prior to expiration. It is up to the individual amateur to write for the renewal application blanks in time to comply with this requirement. Otherwise a prized call may be lost, and if renewal is not received by the expiration date of the old license, operation must cease until the new one arrives. Remember, too, that both station and operator licenses must be displayed conspicuously in the station.

— K. B. W.

## Measure Easily Resistance—Voltage—Current



Super Akra-Ohm wire-wound Resistors and Shunts afford an inexpensive means to build test equipment for the measurement of resistance, voltage, and current with accuracy.

A combination for the measurement of voltages and resistances is shown in the above diagram.

Super Akra-Ohm wire-wound Resistors are manufactured in any value from 100 ohms to 10 megohms. They are carefully designed to insure an accuracy of one per cent and a constant permanency of calibration. Their use is highly recommended for Laboratory Standards, High Voltage Regulators, Telephone Equipment, Television Amplifiers, Grid and Plate Resistors, Electrical Apparatus, and Test Equipment, etc.



Prices range from \$1.25 for 100 ohms to \$4.00 for 500,000 ohms

Send us your dealer's or jobber's name and we will send you a copy of

**Bulletin 73-C**

We manufacture special multiplying resistors for A.C. voltmeters. Full information will be sent on request.



## Strays

It seems we were a bit too hasty in making that remark about the lack of a tube with a plug-in filament in *Strays* a month or so ago. Don Hawley, of Plant City, Fla., informs us that such a tube was described in one of the popular magazines not long ago. Anyhow this tube is a heater-type gadget, and we were thinking of d.c. tubes!

If your ears are getting corns from wearing the 'phones and you can't beg, borrow or steal a set of regular cushion pads, visit the Amateurs' Paradise and invest a pair of dimes in the same number of bath sponges. Cut a hole in the center of each and enlarge it on one side so the cans will fit tightly, and you're all set to be a boiled owl. W9PA sent us this one.

# Duovac Announces TRANSMITTING TUBES

*of exceptional precision  
and uniformity*

**D**UOVAC Transmitters are made to extremely rigid specifications and with great care. They are capable of handling large overloads if used intelligently.



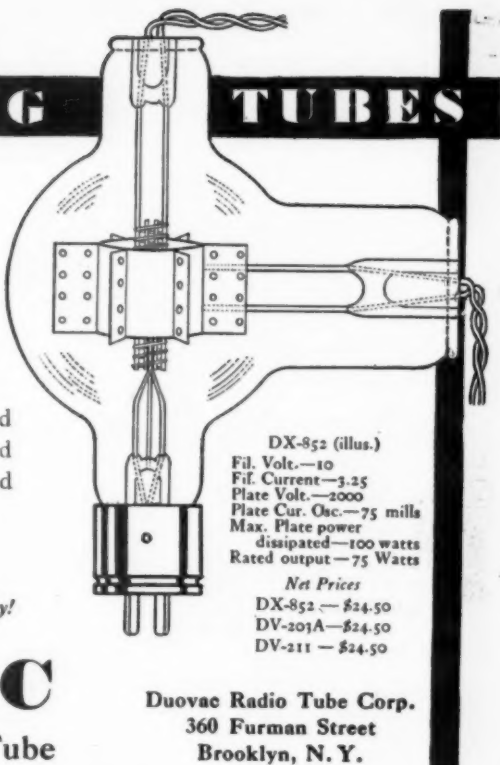
Dr. Paul G. Weiller, formerly with Westinghouse, in charge of Duovac Transmitting Tube production.

Each tube is thoroughly tested before shipping, and is guaranteed as to electrical characteristics and mechanical construction.

*Order direct from factory  
enclosing check or money order.  
No red tape—immediate delivery!*

## DUOVAC

The Precision Radio Tube



DX-852 (illus.)  
Fil. Volt.—10  
Fil. Current—3.25  
Plate Volt.—2000  
Plate Cur. Osc.—75 mills  
Max. Plate power  
dissipated—100 watts  
Rated output—75 Watts

*Net Prices*  
DX-852 — \$24.50  
DV-201A — \$24.50  
DV-211 — \$24.50

Duovac Radio Tube Corp.  
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Brooklyn, N. Y.



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with its joy and good will—why not extend its spirit over the whole year? The fund from the sale of Christmas seals in December will carry help and education against tuberculosis throughout all 1931.

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**Buy Christmas Seals  
Fight Tuberculosis**

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**No longer  
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Our resistors are accurately rated, maintain their tolerance and are noted for their rugged strength and quietness. All types from 1 ohm to 200 megohms—the choice of leading engineers, the largest radio manufacturers and the majority of service men.

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**Write for  
it today.**



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THE ACME WIRE CO.  
**PYREX** Radio Engineering Laboratories  
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Ward Leonard  
Vibrohm  
**Farrand**  
Rajah  
ELKON  
Knapp  
PARVOLTS  
HOWARD  
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Scientifically equipped  
to economically export  
dependable receiving  
and transmitting radio  
apparatus

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**FROST-RADIO** Volume Controls are designed by forward-looking engineers whose ability comprehends tomorrow's problems as well as today's requirements.

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**HERBERT H. FROST, INC.**  
Main Offices and Factory: ELKHART, IND.

## Financial Statement

BY order of the Board of Directors the following statement of the income and disbursements of the American Radio Relay League for the third quarter of 1930 is published for the information of the membership.

K. B. WARNER, *Secretary.*

### STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED SEPTEMBER 30, 1930

REVENUE		
Advertising sales, QST.....	\$16,834.30	
Newsdealer sales.....	10,987.03	
Handbook sales.....	3,821.60	
Membership dues.....	9,402.57	
Beginners' booklet sales.....	180.84	
Emblems.....	146.57	
Interest earned.....	873.47	
Cash discounts earned.....	295.74	
Bad debts recovered.....	5.00	\$42,547.12
Deduct:		
Returns and allowances.....	\$3,891.26	
Less portion charged to reserve for newsstand returns.....	259.51	
	\$3,631.75	
Cash discount on sales.....	258.11	
Exchange and collection charges.....	11.40	3,901.26
Net Revenue.....		\$38,645.86
EXPENSES		
Publication expenses, QST.....	\$12,583.21	
Publication expenses, Handbook.....	2,094.45	
QST misc. receipts and expenses, net balance.....	293.54	
Salaries.....	17,214.43	
Forwarding expenses.....	630.89	
Telephone, telegraph and postage.....	1,230.51	
Office supplies and general expenses.....	1,659.33	
Rent, light and heat.....	931.06	
Traveling expenses.....	1,830.71	
Depreciation on furniture and equipment.....	450.46	
Communications Department field expenses.....	72.99	
Headquarters station expenses.....	232.41	
Total Expenses.....		39,223.99
Net Loss from Operations.....		\$578.13

## Calls Heard

(Continued from page 51)

w2baa w2bda 22bg w2bux w2bwe w2cjq w2evj w2el w2dp  
w2kj w2jn w2mb w2rs w2qn w2vd w3arp w3ckl w3dh w3jr  
w3mv w3ra w3vm w3ww w4abl w4aek w4ahc w4ajk w4akt  
w4aq w4ej w4kh w4lo w4ly w4oa w4sk w4vl w5ada w5adp  
w5aec w5nom w5atf w5aux w5avc w5ot w5qu w5wg w5tce  
w6ama w6atr w6awp w6aqj w6abx w6bjd w6brv w6bj  
w6bto w6bxv w6byb w6bzv w6cbp w6cot w6ctp w6cxw  
w6czm w6dcv w6de w6djp w6dmk w6dml w6dwi w6dyr  
w6edt w6cem w6egh w6eje w6ih w6kt w6se w6te w6us  
w6up w6wb w6aq w7aaz w7ajq w7anj w7dl w7mo w7ly  
w8adm w8abm w8ahe w8aug w8caq w8cut w8dhe w8djv  
w8ti w8ud w9anq w9beu w9bfb w9bmu w9ce w9dga w9djd  
w9enp w9eca w9end w9eta w9fgy w9gdl w9ghh w9ka w9t  
ac1ts ac8hm celah celak cel3er cm8uf ct1aa ct1bx ct1by  
d4nez eu2aa f5ey f8ej f8ex f8fk f8fo f8cher f8gdb f8hz  
f8jqd f8lgb f8prx f8rko f8rrr f8an f8an g2cj g2cx g2ga g2gm  
g2ip g2lx g2nm g2op g5bj g5by g5bz g5ml g5ms g5wk g6ae  
g6ab g6rb g6vp g6wk g6wt g6xb g6xq g6wg haf8b helq  
il9 k4dk k6akf k6ecu k6dud k6ewb k6bhl k6aze ka1dl ka1r  
kfr5 kfu5 la1g lu6aj oa4c oa4j oa4q oa4t oa4z oh2nm oh2og  
oh2pg on4au on4bc on4ba on4di on4fb on4fp on4wx on4za  
oz7y pa0dw pa0qf pa0tw pk1jr pk3bm pk3bq pk4pa sm3tn  
ve2ac ve2bg ve4ea vs6ab vs6ae vs6ag vs6ab vs7ap x9a yslap  
yxlx fq8hpg

# !! HEAVY DUTY QUARTZ PLATES !!

## FREQUENCY RANGE

14,000-kc. to 500-kc.

PRECISION: One tenth of one percent

### PRICES

Without holder  
all frequencies \$12.00

With holder (sealed)  
\$20.00

### FOR THE FIRST TIME

1. Fundamentals on waves as low as 20 m.
2. All crystals power crystals.
3. All crystals one price.

*Delivery prepaid, terms cash, no discounts*

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Cambridge, Mass.

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NEW! RENEWABLE HIGH VOLTAGE LITTELFUSES to protect broadcast equipment, etc. 1000, 5000 and 10,000 volts. Sizes: 1/16, 1/8, 1/4, 3/8, 1/2 amps. in each voltage. Price — 35c to 95c. Renewals — 10c to 20c. Low Voltage Littelfuses — 10c to 20c. Sizes: 10 mil, 1/32, 1/16, 1/8, 1/4, 1/2, 1, 2 amps. "Quicker than a Short-Circuit."

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No. 10 Mahogany (2 tube size inside 11 1/4 L. x 7 D. x 5 9/16 H.) \$1.60 F.O.B. Mill. No. 20 Walnut (3-4 tube size inside 12 L. x 8 D. x 6 1/4 H.) \$1.90 F.O.B. Mill. No. 30 Mahogany (Special size inside 25 L. x 7 D. x 5 9/16 H.) \$2.50 F.O.B. Mill. No. 40 Low Boy (Walnut). Price and details on request.

Price includes wood parts, hinges, filler and stain for finishing. All orders are cash or 25% advance on C.O.D. shipments. Height shown is net measured from top of 3/4 inch mounting board.

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Coils — Magnet Wire Wound  
Magnet Wire All Insulations  
Varnished Insulations  
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All products made to Recognized Commercial Standards including those of:

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In addition we distribute the products of most manufacturers of similar equipment. We believe this to be the most complete presentation of such merchandise available. Our stock is good, shipments fast, prices the best.

Send for it today. Price to individuals, 10c, refunded on first order.

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Waseca Minnesota

William D. Tullis, Radio Operator, Station WUE,  
Fort George Wright, Washington

14,000-ke. band

1ake 2atz 3cub 4vj 5ao 4at 5alp 5ain 5dqe 5bex 5nug 5bna  
6eaz 6eub 6ekm 6og 6exd 6dep 6dpp 6eub 6aix 6exq  
6vq 6dmk 6eep 6bst 6dtd 6dyo 6eqw 6eri 6ess 6arp 6qp  
6dse 6car 6ele 6bqk 6dal 6cr 6agr 6akw 6es 6bhy 6eup 6ebo  
9da 9fur 8cif 9gme 9afn 9fbh 9aad 9are 9fag 9ak 9fke 9eai  
9bvh 9gep 9ed 9ads 9dbt 9gau 9efil

W9AFN, P. B. Lovgren, 7846 Euclid Ave., Chicago, Ill.

3500-, 7000- and 14,000-ke. bands CW

w6aan w6ac w6adl w6aed w6aep w6aer w6age w6ags w6aij  
w6aim w6ake w6akf w6alu w6ama w6anq w6any w6aoa  
w6aob w6ast w6ati w6atm w6avd w6awd w6awy w6ba  
w6bbp w6bcd w6bch w6bck w6bgl w6bgj w6bht w6bif  
w6bjf w6bix w6bnc w6boq w6bpm w6bqy w6brv w6bre  
w6bvz w6bdk w6bej w6bsv w6bxe w6bxv w6byy w6byz  
w6bzv w6cal w6car w6caz w6cbp w6cbr w6cf w6cle  
w6cgv w6ch w6chy w6cui w6cis w6cnp w6cux w6cox w6cql  
w6cqw w6csp w6cte w6ctk w6ctp w6cuu w6cun w6cwt  
w6cww w6cxw w6cyi w6eri w6dac w6dcu w6def w6ddl  
w6dep w6dgj w6dgn w6dgw w6dio w6dkw w6dkx w6dky  
w6dmi w6dnh w6dni w6dob w6dqh w6dqv w6dvi w6dwi  
w6dww w6dxc w6dyj w6dyn w6dyv w6dza w6dzu w6dzz  
w6ebg w6ebx w6een w6edd w6edj w6eem w6eep w6efa  
w6efv w6egk w6egu w6eke w6eke w6eze w6ejh w6ell w6eou  
w6epz w6eqq w6eqw w6erc w6eri w6esa w6etr w6euh w6eup  
w6evy w6feg w6fey w6fyv w6fza w6fzg w6gzl w6fz w6hy  
w6id w6ijn w6jmi w6jy w6ka w6kg w6kq w6kx w6lb w6lx  
w6ma w6mf w6oj w6op w6sa w6sv w6tm w6uc w6ud w6uu  
w6wb w6wi w6yau w6zq w6zzg w6zzz velbr velco veldr  
ve2ac ve2bb ve2am ve2ca ve3dn ve3bd ve3da ve3dw ve3et  
ve3hd ve3he ve3xc ve3xk ve4af ve4bx ve4ci ve4gf ve4go  
ve4hh ve4ho ve4jg ve5af ve5am ve5aw ve5cj ve9al ve9aj  
k4acf k4dk k4kd k4ni k4rf kfu5 kfr6 kdv5 k6alm k6edd  
k6eg k6dqk k6dud k6egd k6evv k6ewb k7abs k9zzg cm2jm  
cm2jt cm2ra cm2rz cm2sh cm2xa cm2yb cm5fl cm5er  
cm8et cm8st cm8yb ct1aa ct1bx earl13 f8fr f8dot f8mre  
g5by g5yx g6ut oa4j oa4q oa4t oa4z lu3dh lu3fa lu3pa  
py1aa py1ah py1aw py1er py2ak py2ay py2bg py2ih py2k  
py3ab py3ab py3ia py3he celah ce2ab ce3bf ce5na vo8ae vo8lk  
vo8me helfg he2jm nn1nie nn1nx nn7nic nn7xj cx2ak ys1fm  
ys1x rx1aa ti2ra nj2pa tm2elo lap cx7 qqla cabl wft wfa  
wfat wye wlm xwlm xee xebm x9a xlg xlj x29a xda xmg  
nkf nagk nijn kfst sfn al1bb al2ac al4am vk2kj vk2rx vk3up  
vk5km pk1jr

14,000-ke. 'phone band

w5ql w6uj

3500-ke. 'phone band

w1aby w1ld w2aqt w2bee w2ej w2hy w3aex w3bj w3ev  
w3oo w4neu w4hn w5awp w5kx w6abf w6bbj w6ean w6kt  
w7acq w7alw w7ant w8acb w8ahs w8ajh w8akw w8aws  
w8azo w8bhf w8buw w8byr w8cew w8ces w8elh w8ejd  
w8emu w8ewu w8cy e w8dgs w8dpd w8del w8ih w8rd w8wf  
w9ajq w9ath w9ata w9bag w9bjc w9bpb w9bpt w9bty  
w9bvp w9bwi w9bwt w9cdd w9cii w9cld w9cms w9daq  
w9dbe w9dzt w9edw w9ehd w9egq w9ewc w9ewx w9fd  
w9get w9ghx w9gku w9jr w9mm w9mp w9kb w9cqx

W1PE, Arthur E. Berg, 62 Hemman St., Roslindale, Mass.

14,000-ke. band

cm2jm cm2sh cm8uf ene ct1aa ct2an cx1af f8aly f8ca f8dmf  
f8fo f8jq f8ka f8mre f8rvl f8wag f8shh f8spz g2gm g5bj  
g5by g5bz g5dj 5gm1 g5mt g5vl g6mt g6rb g6rv g6wt g6xi  
haf8b h33dh lu3de lu3fa lu3da lu6fi n18ez oa4j oa4z on4ic  
on4rs on4us pa0aq pa0qf pa0wr py1as py1cm py2ab py2aq  
py2ay py2ba py2bf py2bg py2bk py2bl py2bm py2bo py2jb  
py9an ve2be ve3bm ve3gx ve3wk ve4ae ve4bb ve4bu ve4el  
ve4fx ve4jc vo8ae vo8me w5aao w5ada w5afb w5agz w5ani  
w5ark w5arv w5bhs w5go w5mx w5er w5vq w6acp w6aj  
w6ave w6bax w6bhp w6bto w6btt w6cui w6cpx w6ctv  
w6dbb w6dke w6eep w6efa w6egh w6egk w6ele w6elp  
w6ewm w6ph w6tg w6vj w7aag w7ahx w7aic w7be w7bro  
w7do w7fh w7it w7lk w7ex w7vy wdde x9a xee

14,000-ke. 'phone band

w1uh w1aze w6asj



Type TH 200 — 2 mfd  
2000 v. D.C. — 1600 rms RAC



Type T 200 — 2 mfd  
1500 v. D.C. — 1000 rms. RAC

Planning A New X-Mitter?  
Rebuilding Your Old One??  
Need Some Real Good Condensers???

THEN, BE SURE TO GET

## FLECHTHEIM SUPERIOR CONDENSERS

YOU GET THE VERY BEST WHEN YOU BUY

**F**INEST **L**EAST **E**XPENSIVE **C**ONDENSERS **H**AVING **T**HE **H**IGHEST **I**MPROVING **M**ODULATION **S**UPPLY

Among Other Users, ARE: Western Air Express, Pan-American Airways, Southern Air Transport

Ur QSL crd w1 bring u latest catalog es name of nearest Dealer 73 w2afs

"USED BY OVER 50% OF THE BROADCASTING STATIONS"  
A. M. FLECHTHEIM & CO., INC. 136 Liberty St., New York, N. Y.  
(Established 1911)

**NEW! NEW! NEW!**

### LAFAYETTE Wide World SHORT-WAVE RECEIVER

It's here! Perfect short-wave reception with the new Lafayette Wide World Short Wave Receiver. A. C. Push-pull amplification. Double Screen Grid. 9 to 550 metres. Absolutely guaranteed. Fully wired, complete with power unit, at a sensationally low price. Write for full particulars TODAY.

#### Many Other Bargains!

Wholesale Radio Service Company, the reliability house of radio, is featuring short wave apparatus of known quality. Write for our 1931 Radio Catalog — "the guide book of radio quality" — sent absolutely FREE. It's yours for the asking!

**WHOLESALE RADIO SERVICE CO., INC.**  
36 VESEY ST. Dept. M-11 NEW YORK



### Guaranteed Radio Bargains

**FRESHMAN** type "N" power packs. Brand new and in original cartons. Can be used to power a 210 oscillator or a 250 power amplifier. It solves the problem of getting pure d.c. power supply. D.C. output is 500 volts at 70 mills with taps at 135 and 80 volts. A.C. output is 7 1/2 center-tapped for 2 210's or 250's, 2 1/2 c.t. to 227 and two 1 1/2 center-tapped windings for 226 tubes. Has a plug for the field coil of a d.c. dynamic speaker. A 281 is used as a rectifier. Price, less tube . . . . . \$16.75

**DONGAN** 250 watt transformer with line ballast resistors. Insures absolutely steady voltage regulation. Completely mounted and shielded. Terminal lugs at top. Resistors furnished free. Secondary high voltage output is 1500 volts, center-tapped at 750 volts. Filament output is 15, 7 1/2, 7 1/2 center-tapped, and 2 1/2 center-tapped. Get your order in fast as there are very few left. Price complete . . . . . \$6.50

**KNIGHT** 150 watt transformers. Ideal for 210 power supply using half wave rectification. High voltage is 600 volts. Filaments are two 7 1/2 center-tapped windings, 2 1/2, and 1 1/2 volts . . . \$2.75

**COLUMBIA** 30 henry, 200 mill chokes. A real rugged choke for heavy duty power filter supply. Mounted . . . . . \$2.50

**THORDARSON** 30 henry 150 mill chokes . . . . . \$3.25

**THORDARSON** 20 henry 250 mill chokes . . . . . \$3.75

**COLUMBIA** 30 henry 120 mill chokes, mounted . . . . . \$1.30

**GRID LEAKS** Wire wound and enamel coated. For all tubes up to 250 watts. 10,000 ohm, \$9.5, 5,000 ohm, \$6.5

**TUBES** of high quality and durability. Guaranteed to stand up. FREE 30 day replacement. Type X281, \$1.60; X250, \$2.05; X224, \$1.20; X171-A, \$.70; X280, \$.90; X245, \$1.20

**COLUMBIA TRANSMITTING FILTER CONDENSERS** Newer and better. We have been swamped with orders since these extra heavy duty condensers were offered. Insulated binding post terminals. And with a REAL replacement guarantee.

Capacity	1000 d.c.	1500 d.c.	2000 d.c.
1 mfd.	\$1.50	\$3.10	\$3.95
2 mfd.	\$2.40	\$4.60	\$6.95
4 mfd.	\$3.90	\$8.95	\$11.50

**COLUMBIA GRID and PLATE** blocking condensers. Made with the same strict specifications as the filter condensers. You can't go wrong with these condensers in your set. They DON'T break down!

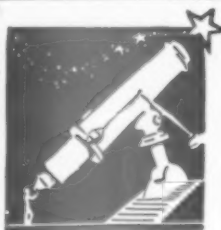
Working Voltage	5000	.001	.002
1000 d.c.	\$9.00	\$9.00	\$9.00
2000 d.c.	\$1.05	\$1.05	\$1.05

See our engineering department ad on page 0000 for s.w. apparatus.

Orders are cash or C.O.D. All merchandise fully guaranteed.

**COLUMBIA SPECIALTY CO.**  
1038 Longwood Ave. New York City





## Searching the Infinite

Out across space, giant telescopes are bringing new stars into our ken. In millions of radio receivers **CENTRALAB** volume controls are helping to reach out across space to bring in noiseless, sputterless reception.



### Dealers and Servicemen:

Send 25c for new **VOLUME CONTROL GUIDE** giving control circuits for old and new sets.

SEND THIS COUPON NOW

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CENTRAL RADIO LABORATORIES

Dept. 328F, Keefe Ave. and Humboldt  
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Enclosed find 25c for your new **VOLUME CONTROL GUIDE**.

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Address.....

City..... State.....

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Easy-Working  
Genuine Martin No. 6

## New VIBROPLEX

(Reg. Trade Marks: Vibroplex; Bug; Lightning Bug)

The smoothest,  
easiest - work-  
ing bug on the  
market. Easy  
to learn. Easy  
to operate.  
Makes  
sending  
easy.

Black or  
Colored, \$17. Nickel-  
Plated, \$19



**Improved  
MARTIN  
Vibroplex**

Black or  
Colored, \$17  
Nickel-  
Plated, \$19

Special Martin Radio Bug — Extra large, Specially  
Constructed Contact Points for direct use without  
relay. Black or Colored, \$25

Old Vibroplex accepted as part payment  
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**THE VIBROPLEX COMPANY, Inc.**

825 Broadway, New York City

Cable Address: "VIBROPLEX" New York

LU4DQ, Moises Tapiero, 214 Espana St., Bahia  
Blanca (Bs As) Argentina

14,000-ke. band

wlabd wlbux wlbvl wlcxm wlcqr wlda wlzi wlzz w2aeb  
w2ai w2ait w2ag w3hg w3ab w4ly w4wt w5aot w5awd  
w6ajm w6apd w6awf w6bax w6byb w6ban w6car w6ctp  
w6cam w6de w6dmk w6dts w6ejc w6ete w6id w6jp w6ln  
w7mo w8ads w8bti w8cux w8dgp w8dgr w9cps w9fbw  
w9fur w9dgh w9pv w9r3 ac2al ac3fr xu2uu celal celak  
ce2bm ce3bm ce3ca ce3ch ce3cr ce3da ce5aa ce7aa cm2to  
cx2bt cxewk ear10 ear21 ear96 f8aap f8ex f8orm f89er  
ct1lx ct1by g2gm g2kf g5bj g5rm g6ko g6mc g6gc g6rb  
g6wl g6wn g6mu haf3c he2jm helfg j1dn j2cb j3fs k6aac  
k6avl k6bhl k6boe k6etf oa4j oa4p oa4q oa4t oa4x oa5  
oh2nad oh2naw ok1ab on4he on4j oz7t pa0fp pa0fr  
pa0xv py1ah py1aw py1bt py1bs py1cd py2ad py2ak  
py2aq py2bk py2bm py2bz py2if py2ik py2in py3ac  
py3ag py3ao py3aq py3de py3gv py3gf py3iw py3ru  
py3wa py8ia py9ac py9c ve2bh ve3bk ve5bl vk2ek vk2na  
vk3go wk4bb allan al1ax al1ba al1fb al1fc al1fu al1fr  
al1fw al1fr al1ze al2bg al2bp al2gh al2gq al3as al3aw al4ao  
al4ax al4be sp3ar ti2ea x9a splac splba sp2ab ss2n szst  
zuld zu6e

ONR470, M. de Waepenaert, Rue Soeurs-Noires  
22, Termonde, Belgium

14,000-ke. band

wlae wlaep wlaig wlaiky wlapq wlaqd wlaqt wlawu  
wlaae wlabd wlbhm wlbip wlbob wlbwa wlcex wlcft  
wlcmx wlcom wldp wlda wlog wlok wlvc wlvz wlwa  
wlwv w2acy w2afr w2aht w2amr w2arb w2atk w2aac  
w2bai w2bak w2bbh w2bda w2bia w2biv w2bka w2bkv  
w2bro w2bvk w2bwc w2byr w2cuq w2el w2jn w2ju w2js  
w2oa w2qd w2vo w2wl w2zg w3acx w3ads w3ajd w3alp  
w3ace w3fb w3ut w3zac w4aef w4ql w4vs w8aik w8afm  
w8alh w8ath w8auu w8axa w8bbl w8bbp w8bji w8bwk  
w8dae w8dgp w8div w8dpo w8duw w8ea w8kr w9aja  
w9exw w9ka k4kd velac ve3da ve5ao vo8ae cm5cx pylca  
pylah pylib zslp ss4m ss5u ss5d zu6w st5r

W3AFU-W3BHV, Washington, D. C.

7000- and 14,000-ke. bands

ct1aa ct1bd ct2aa ct2ac d4cc ear16 ear21 ear65 ear113  
ear149 f8aix f8am f8bw f8cs f8da f8dmf f8dot f8lx f8myl  
f8rgh f8ror f8sua f8wr f8xd f8xic g2ao g2gf g5ia g5wk  
g6gd g6rb g6th g6up g6vp g6vr g6px g6xn ill ila n2pa  
on4gn on4jk on4kw xon4wm pa0qf pylak sp3vb su8n  
ve5ao vo8an vu2zk za4a za4m

S. S. Exford, George Brown, Opr., Box 920, 25  
South St., New York, N. Y.

1000 to 2000 miles east of New York

w1aft w1bdl w1cpo w1bq w1bke w2abe w2av w2jc w2kl  
w3ajh w4abt w4dt w5pa w5aha w5no w6vv w6cf w9axh  
w9cfw w9epi kfr6 py7na k7ak 33cs

2000 to 3000 miles east of New York

w2anh w4tt w4ft w4qe w4kd w4qd w4gk w5ds w8cau  
w9car w9eye foljc sp3be f8em f8aap g5aq helfg ybix  
y8an x4a

3000 to 4000 miles east of New York

w1gw w1ben w1ah w1ajq w1ben w1wr w1ack w1ajw w1add  
w2ap w2af w2aao w2bbm w2bnu w2qf w2cxl w2anr w2bqi  
w2qf w2ejj w2cex w2byx w2bds w2cel w2zg w2bvy w2afr  
w2zc w2ach w3kr w3bbk w3ara w3dqv w3aor w3ckl w3dk  
w3pt w3kq w3bwt w3na w4vb w4uj w4aiq w4mh w4aiq  
w4dv w4va w4nm w4he w5ww w8tn w8chl w8aff w8bps  
w8chq w8adj w8cwu w8cau w8bfr w9cfa

4000 to 5000 miles east of New York

w1azd w1cg w1ben w1mk w1ben w1bil w1rp w1aps w1qv  
w1agn w1ajc w1caa w2ano w2bda w2qn w2cex w2bmm  
w2anh w2ays w2bwk w2bxi w2am w2bkg w2apn w2cuo  
w3la w3awn w3dh w3cvt w3bqi w3bnu w4pf w4vw w4ab  
w4gk w4eg w4rx w4br w4adw w4aef w4afw w5bex w5ww  
w5ya w8vy w8doa w8bno w8bps w9bwk cm2xc

# Section Communications Managers of THE COMMUNICATIONS DEPARTMENT, A. R. R. L.

ATLANTIC DIVISION			
Eastern Pennsylvania	W3ZF	Don Lusk	116 West Wyoming Ave. Germantown, Phila.
Maryland-Delaware-District of Columbia	W3BBW	Forrest Calhoun	1636 Thomas Ave. Baltimore, Md.
Southern New Jersey	W3ATTJ	Bayard Allen	416 Mount View Ave. Mount Holly
Western New York	W8CKC	John R. Blum	44 Seward St. Danville
Western Pennsylvania	W8CFR	Robert Lloyd	175 Allegheny Ave. Emsworth (Pgh) Pa.
CENTRAL DIVISION			
Illinois	W9APV	Fred J. Hinds	3337 Oak Park Blvd. Berwyn
Indiana	W9BKJ	George Graue	824 Home Ave. Fort Wayne
Kentucky	W9BAZ	J. B. Wathen, III	Mockingbird Valley Louisville
Michigan	W8DYH	Ken Conroy	7553 E. Robinwood Ave. Detroit
Ohio	W8BAH	Harry A. Tummonds	2073 West 85th St. Cleveland
Wisconsin	W9VD	C. N. Crapo	2111 E. Newton Ave. Milwaukee
DAKOTA DIVISION			
North Dakota	W9BVF	Guy L. Ottinger	326 6th Ave., So. Jamestown
South Dakota	W9DNS	Howard Cashman	121 N. Spring Ave. Sioux Falls
Northern Minnesota	W9BVH	Carl L. Jabs	1822 James St. St. Paul
Southern Minnesota	W9EFK	J. C. Pehoushek	60 Melbourne Ave., S. E. Minneapolis
DELTA DIVISION			
Arkansas	W5ABI	H. E. Velte	315 No. Jackson St. Little Rock
Louisiana	W5WF	F. M. Watts, Jr.	1716 Park Ave. Shreveport
Mississippi	W5AKP	J. W. Gullett	1708 23rd Ave. Meridian
Tennessee	W4SP	James B. Witt	832 N. Fifth Ave. Knoxville
HUDSON DIVISION			
Eastern New York	W2OU	H. J. Rosenthal	Box 740 New Rochelle
N. Y. C. & Long Island	W2BGO	V. T. Kenney	1836 Hone Ave. Bronx
Northern New Jersey	W2WR	A. G. Wester, Jr.	50 Princeton St. Maplewood
MIDWEST DIVISION			
Iowa	W9DZW	H. W. Kerr	915 Lincoln Ave. Little Sioux
Kansas	W9CET	J. H. Amis	8010 Mercer St. Topeka
Missouri	W9RR	L. B. Lazure	8010 Mercer St. Kansas City
Nebraska	W9FAM	Samuel C. Wallace	Green St. Clarks
NEW ENGLAND DIVISION			
Connecticut	W1CTI	Frederick Ellis, Jr.	7 Union Ave. Norwalk
Maine	W1AQL	G. C. Brown	269 No. Main St. Brewer
Eastern Massachusetts	W1WV	M. W. Weeks	40 Norfolk Rd. Chestnut Hill
Western Massachusetts	W1JV	Leo R. Peloquin	24 Arthur St. Worcester
New Hampshire	W1ATI	V. W. Hodge	227 Main St. Claremont
Rhode Island	W1BCR	C. N. Kraus	92 Keene St. Providence
Vermont	W1IT	Clayton Paulette	North Troy
NORTHWESTERN DIVISION			
Alaska	WWDN	W. B. Wilson	U. S. LHT Fern Ketchikan
Idaho	W7AKZ	Oscar E. Johnson	422 Antone St. Sandpoint
Montana	W7AAT-7QT	O. W. Viers	Red Lodge
Oregon	W7UN	Wilbur S. Claypool	Route 11, Box 247 Milwaukie
Washington	W7ACS	Eugene A. Piety	912 No. Ainsworth St. Tacoma
PACIFIC DIVISION			
Hawaii	K6CIB	L. A. Walworth	2737 Ferdinand Ave. Honolulu
Nevada	W6EAD	Keston L. Ramsay	1151 Buena Vista Ave. Reno
Los Angeles	W6EQF	B. E. Sandham	4508 8th Ave. Los Angeles
Santa Clara Valley	W6NX	F. J. Quemont	1348 Hanchett Ave. San Jose
East Bay	W6CZR	J. Walter Frates	439 62nd St. Oakland
San Francisco	W6WB	C. F. Bane	262 Castro St. San Francisco
Sacramento Valley	W6DON	Everett Davies	Rt. 5, Box 380 Sacramento
Arizona	W6BWS	Russ Shortman	519 W. Madison St. Phoenix
Philippines*	KAIJR	John R. Schultz	San Diego Calapan, Laguna, P. I.
San Diego	W6EOP	Harry Ambler	San Diego San Diego
San Joaquin Valley	W6BVY	E. J. Beall	Box 246 Newman
ROANOKE DIVISION			
North Carolina	W4DW	H. L. Caveness	State College Raleigh
Virginia	W3CA	J. F. Wohlford	118 Cambridge St. Roanoke
West Virginia	W8JM	D. B. Morris	703 Maryland St. Fairmont
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Utah-Wyoming*	W6DPJ	C. R. Miller	134 E. 2nd North St. Provo, Utah
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Alabama	W4AHP	Robt. E. Troy, Jr.	516 Cloverdale Rd. Montgomery
Florida	W4AII	Harvey Chafin	6002 Suwanee Ave. Tampa
Georgia-So. Carolina-Cuba-Isle-of-Pines-Porto Rico-Virgin Islands	W4RZ	M. S. Alexander	47 2d Ave., S. E. Atlanta
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Northern Texas	W5RJ	Roy Lee Taylor	1614 St. Louis Ave. Ft. Worth
Oklahoma	W5GF	W. J. Gentry	538 N. Pottenger St. Shawnee
Southern Texas	W5ZG	H. C. Sherrod	4715 Crockett Blvd. Galveston
New Mexico	W5AHI	Leavenworth Wheeler, Jr.	Box 33 Yalmora
MARITIME DIVISION			
Maritime*	VEIDQ	A. M. Crowell	69 Dublin St. Halifax, N. S.
ONTARIO DIVISION			
Ontario	VE3FC	E. C. Thompson	266 Queensdale Ave. Toronto, 6
QUEBEC DIVISION			
Quebec	VE2AC	Alphy Blais	Box 221 Thetford Mines
VANALTA DIVISION			
Alberta	VE4EC	Fred Barron	Warwick Apts., 95th St. Edmonton
British Columbia	VE5AL	J. K. Cavalsky	4868 Blenheim St. Vancouver
PRAIRIE DIVISION			
Manitoba	VE4HR	A. V. Chase	109 Lanark St. Winnipeg
Saskatchewan	VE4FC	W. J. Pickering	514 19th St. W. Prince Albert

\* Officials appointed to act until the membership of the Section choose permanent SCMs by nomination and election.

## LEEDS Listening Monitor



For checking your note, its stability and whether D.C. or not. THE ONLY SURE CHECK. Gives you an accurate idea as to what your signal sounds like to the other fellow. The Leeds Monitor is encased in an aluminum shield, 5" x 6" x 9" overall. 3 plug-in coils having a range of 15 to 90 meters are supplied. Completely shielded, with batteries self contained. Supplied with A. & B. batteries, but without 1-UX. 199 tube. Special.....

**\$15.00**

## LEEDS 50 WATT SOCKET



Heavy special porcelain base. Double phosphor bronze springs, high grade construction throughout. Extra special price.....

**\$2.45**



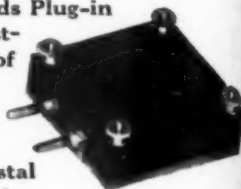
**The Home of RADIO**  
**45 VESEY STREET**  
**NEW YORK**

**New York's Headquarters**  
**for**  
**Transmitting Apparatus**  
**When in Town Visit Our Store**

*All parts for Nov. Q. S. T.*  
*push-pull transmitter in*  
*stock at special prices.*

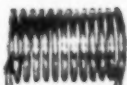
*Bakelite Zepp Antenna*  
*Feeder Spreaders; all drill-*  
*ed; size 10 1/2" x 3/4" x 1/4"*  
*Special 6 for \$1.00*

## Leeds Plug-in Dust-proof



## Crystal Holder

To meet the demand for a carefully constructed, reasonably priced Crystal Holder, LEEDS Labs are now presenting this item. Accurately machined and constructed of excellent material throughout, this holder will give thorough satisfaction. List price, \$6.00. Special offer. **\$4.25**



## COPPER COIL

Make your own transmitting and receiving coils. Copper tubing transmitting inductance.

Size of tubing			
Inside Dia.	3/16"	1/4"	5/16"
2 1/8"	9c	10c	12c
2 3/8"	9c	10c	15c
3 1/8"	10c	12c	17c

Prices per turn

## LEEDS RADIO LABORATORIES

**Precision Custom Built Short Wave Receivers and Transmitters**

This department under the supervision of the Short-Wave Specialist Jerome Gross. We design, construct and advise on any material for the "Ham" Broadcasting station or laboratory. Write Jerry Gross for advice on any of your problems.

A representative Ham Station, incorporating the LEEDS trio; Ham Receiver, 7 1/4 watt Transmitter and Listening Monitor, in a neat efficient layout. This combination is ideal for the beginner or anyone interested in an effective popular priced station.



Write for our circulars on our products. Quotations on special transmitters, etc., supplied upon application.

## LEEDS Short Wave Receiver

The successful operation of any Short Wave Receiver depends almost entirely upon its handling (smooth regeneration control, etc.). The LEEDS Short Wave Receiver has flawless regeneration control from 20 to 80 meters with only 22 1/2 Volts on the detector tube.

No fringe howl is present, and absolutely no hand capacity is found to disturb tuning. Many of these receivers have been sold to people who have tried more elaborate jobs, only to discover that a simpler well balanced receiver would be more efficient and satisfactory for their work.

Three 201-A tubes are used, one as the detector, and two audio stages. The Universal type has a continuous range from 15 to 100 meters, using three plug-in coils.

The Amateur type incorporates a Cardwell 201-E adjustable type condenser for tuning which can be adjusted to give any spread of the bands desired. The set is supplied with 20, 40 and 80 meter coils to cover the Amateur Bands.

Universal or Amateur type Receiver completely constructed and tested, price..... **\$37.50**

## General Radio 50 ohm Rheostat

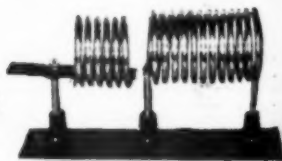


Type 214-A

Your filament voltage regulation problem solved inexpensively. Excellent for use as primary control in your filament transformer; for the 50 watt, UX 852 or 7 1/2 watt.

Price... **\$1.50**

## LEEDS Copper Tubing Transmitting Inductance Units



Wound with heavy copper tubing to diameter of 3". Easily varied antenna coupling device. Size of unit 5 1/4" high, 14" long overall. Satisfactory for use up to 250 watts, with straight oscillators or in power amplifier circuits.

80 meter type.....	\$11.00
40 meter type.....	\$10.00
20 meter type.....	\$9.00

This unit is used in all of our Special Transmitters

PLEASE PRINT YOUR NAME AND ADDRESS PLAINLY TO AVOID DELAY

WRITE FOR SPECIAL PRICE LIST

MAIL ORDERS FILLED SAME DAY  
10% Cash Must Accompany All C. O. D. Orders



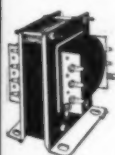
## MESCO 1-2" Spark Coil

The coil of a 101 uses. Can be used as a peaked audio choke with fixed condensers, etc. Many other uses will suggest themselves to the experimenter.  
Reg. \$7. Special \$1.50

## Special 866 Filament Transformer

2 1/2 volt — 10 amps. 10,000 volt insulation. \$5.45

## Thordarson Transformer



150 watts, 400 volts each side of centre tap at 375 M.A. 5 volt filament, centre tap. Fine for power supply for 7 1/2 watt or for crystal control power supply. Specially priced for a short time only. Each. \$3.50

# LEEDS

The Home of RADIO  
45 VESEY STREET  
NEW YORK

New York's Headquarters  
for  
Transmitting Apparatus  
When in Town Visit Our Store

EVERYTHING IN  
ACME JEWELL PYREX  
BRADLEY FLERON  
THORDARSON  
ELECTRAD NATIONAL  
LYNCH SIGNAL  
FLECHTHEIM  
NATIONAL RECTOBULB  
GENERAL RADIO  
CARDWELL AEROVOX  
WESTON  
IN STOCK



## Dubilier Condensers

400 Volts D. C.  
Working  
Voltage

Type 902—3 Mfd.  
—3" high, 2" wide.  
2 1/4" deep. List \$4.50. Special \$1.35

7 Mfd.—5" high, 2" wide.  
4 1/2" deep. List \$7.50. Special \$1.75



## NEON GLOW LAMPS

Made by General Electric Co., type G. 10, standard base. 101 uses, as illustrated in QST May issue page 17. Price only .65c

Standard electric socket for tube. .15c

## WIRE

No. 14 Enamel. . . . . 3/4c Foot  
No. 12 " . . . . . 1c "  
No. 10 " . . . . . 1 1/2c "  
Any length up to 1000 feet



Special LEEDS lead in bowls made of Pyrex. Two cups size 3 1/4" dia. x 2 1/2" high; supplied complete with 18" brass rod, nuts and washers.

Price complete. \$2.25

Larger size cups 6" dia. x 4 1/2" high; complete set two cups. 24" brass rod, nuts and washers.

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## BIG SCOOP—Mesco Keys

Standard for 20 years. Lists from \$3 to \$5. We just bought a big quantity. Better get them while they last at these special prices.



No. 101

No. 101 . . . . . 95c  
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No. 244



No. 103



## FILTER CHOKE

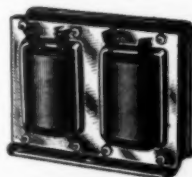
30 Henry, 150 Mill — special heavy choke, good for filter circuits for transmitters up to and including one UX852, or as a modulation choke on medium power transmitters.

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## THORDARSON DOUBLE FILTER CHOKES

Contains Two 18 Henry 250 Mill Chokes

Heavy duty, rugged double Filter Reactor for Filter Circuits in Transmitters, Power Amplifiers, "B" Eliminators and various other purposes. Each Choke has a 2000 Volt insulation and the D.C. resistance of each Choke is 108.5 ohms. When connected in series this Filter Reactor has a capacity of 36 henries at 250 mls, and when connected in parallel 18 henries with 500 mls carrying capacity.



Model T-2458  
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We recommend HH Resistors for the following voltages:

500 to 600 volts — 50,000 ohms — 100 watt. \$2.75  
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100 watt resistors. Size 6 1/4" x 1 1/4"  
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All Above Complete with mounting brackets



200 Watt Centre  
Tapped Transmitting  
GRID LEAK

Size 8 1/2" x 1 1/4" complete with bracket mounting

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The American Radio Relay League, Inc., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the world and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite. Correspondence should be addressed to the Secretary.

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ears...



*Sangamo Transformers  
in the audio end give your  
set a "tone" advantage  
over competition . . . . .*

Successful custom builders and manufacturers know the importance of *tone quality*. Fully 90% of all receiver sales are made or lost on the first hearing. Nothing takes the place of accurate reproduction. Today, the buying public judges by *tone* more than by *price*!

The only way to be sure of tone quality is to be sure of the transformer you use.

Obviously, transformer building, an exact science in itself, should only be undertaken by an organization of specialists. Sangamo is such an organization.

30 years of research experience combined with unsurpassed precision manufacturing facilities guarantee in Sangamo Transformers the most satisfactory amplification over the entire musical frequency scale.

Sangamo "A" Line Transformers give your set a "tone" advantage over competition. The cost is a little higher, but they cut your selling costs by lowering sales resistance.

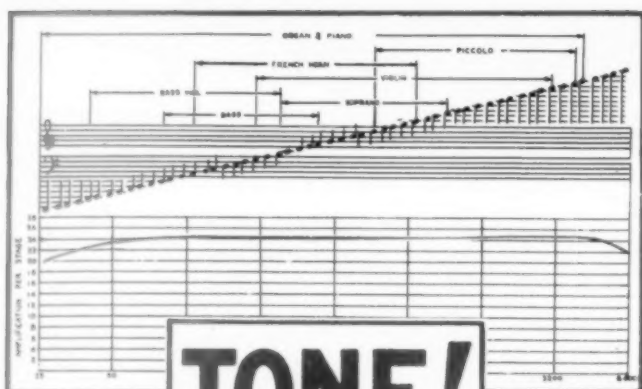
**SANGAMO ELECTRIC COMPANY**  
SPRINGFIELD, ILLINOIS, U. S. A.

*Manufacturers of Precision  
Electrical Apparatus for  
30 years.*



(see reverse side)





# TONE!

Curve of Type "A" as Sangamo Straight Audio Transformer showing uniformity of amplification at all audible frequencies.

## True Tone—



*is the real basis  
of comparison for  
a receiving set.*

### "X" Line Transformers

Type AX straight audio amplification. List price.....\$6.00

Type BX Push-pull Input unit. List price.....\$6.50

Type CX-171 Push-pull Output Transformer, for 171 or 250 power output tubes for cone speaker. List price.....\$6.50

Type DX, same as CX except for 210 and 112 power tubes. List price.....\$6.50

Type HX Push-pull Output for 171 or 250 Power Output tubes to match the impedance of moving coil of Dynamic loud speakers. List price.....\$6.50

Type GX, same as HX except for 210 and 112 power tubes. List price.....\$6.50

Type E Output Choke to match impedance of the various type power tubes. List price.....\$5.00

### "A" Line Transformers

*Similar to X Line but with special core metal to give greater amplification at low frequencies*

Type A straight audio amplification. List price.....\$10.00

Type B Push-pull Input Transformer for all tubes. List price.....\$12.00

Type C-171 Push-pull Output, for 171 or 250 type power tubes with cone speaker.....\$12.00

Type D-210; same as C except for 210 and 112 power tubes.....\$12.00

Type H-171, Push-pull Output for 171 or 250 power tubes for Dynamic Speaker. List price.....\$12.00

Type G-210, same as type H except for 210 and 112 tubes.....\$12.00

Type F Plate Impedance for use as a choke to prevent oscillation and for impedance coupled amplifiers. List price.....\$5.00

*Unusual facilities for furnishing transformers with or without cases ready for mounting and quick assembly with the receiver. Prices on application.*

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ANGAMO ELECTRIC CO.

Springfield, Illinois, U. S. A., Dept. W-94

*For manufacturers* I am interested in engineering data regarding your transformers and condensers.

*For set builders* Please send circulars describing our apparatus and latest audio hook-ups. I enclose 10c to cover cost of mailing.

Name.....

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## The Sangamo Type "A" Condenser



Every sound characteristic is affected by the quality of the fixed condensers in a set. Sangamo builds accurate mica condensers, molded within an overall enclosure of genuine bakelite with only the terminals brought outside. Moisture, heat, shocks or jars will not alter their characteristics nor affect operation after the set leaves the factory.

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"Illini" Condensers are standard with those manufacturers who insist on ratings being actually what the specifications call for. Manufactured by exclusively designed equipment, held to the tolerances your engineering department demands, Sangamo Condensers will reduce to a negligible quantity inspection department rejects and "reassembly" losses in profit.

## Sangamo High Voltage Condensers

Tested at 5000 volts D. C. and 3500 A. C. and built to Sangamo standards, known throughout the radio world, amateurs, commercial men and manufacturers have learned to depend on Sangamo High Voltage Condensers. Accurately rated and adequately tested—these condensers offer the maximum protection in high voltage, high frequency circuits.

Prices on request

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to appear exactly at the time our stock of the previous edition was exhausted, but a printer's over-run leaves on hand about

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**American Radio Relay League  
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Guaranteed — Mounted — Complete  
1KVA 3 phase 1500-2000 v. each side ..... \$40.00  
700 watt 1000—1500 each side ..... 14.50  
250 watt 500—750—1000 each side  
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Auto-Transformers, Chokes, Polyphase and 25-cycle  
Transformers. Add \$2.00 for fil. winding  
**WCVCS FRANK GREBEN**  
1927 So. Peoria Street, Pilsen Sta. Chicago, Ill.

## Power Transformers for the Amateur

Built to withstand overloading and abuse. Mounted ready to use. 110 volt 60 cycles. 250 watt 550, 750 each side center, two 7½ volt CT 4 ampere windings, weight 21 lbs. \$10.50. 150 watt 650-0-650, 7½, 7½ CT windings \$7. Same except 550-0-550 \$6. 700 watt 1000, 1500 volts each side center \$14.50. 250 watt 550, 750, 1000 volts each side center \$10. 1000 watt 1500, 2000 volts each side center \$21.50. Filament transformers, center tapped, 5000 volt insulation. 2½ volt 10 ampere \$3. 7½, 7½, 4 ampere \$3.50. 10 volt 6 ampere \$3.50. 10 volt 13 ampere \$5. 5 volt 10 ampere \$4. 5 volt 20 ampere \$6.50. Transformer 350-0-350, 5, 2½, 2½ volts \$4.50. Unmounted filter condensers, 3½ MFD 1000 volt \$1.75. 2 MFD 750 volt 75c. 3 MFD 600 volt 50c. 2 MFD 35c. Enameled copper wire per 100 feet, No. 14 70c. No. 12 90c. No. 10 \$1.50. Postage extra. **Electrone Labs.,** 834 N. Randolph St., Phila., Pa.

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**Write for Our Discount**

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V insulation.....\$4.75  
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New Vitrohm Plaque Resistor  
Absolutely non-inductive and non-capacitive  
Standard values 5000 ohm, list.....\$2.00

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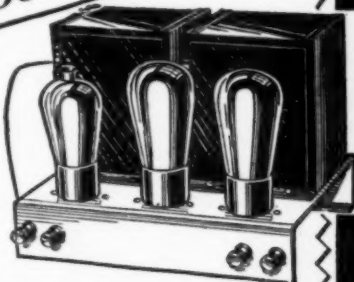
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Better tone—economy—ease  
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**PLATE** power for your set, the very heart of its performance. For quietness, DX ability, life-long permanence, absolute dependability, lowest ultimate cost, no other plate source even approaches the achievement of an Edison steel alkaline storage B battery. Built painstakingly; every joint pure nickel, upset electrically welded. Genuine Edison Electrolyte. Our list describes complete batteries, construction parts, enameled aerial wire, silicon steel. Available immediately, filament and plate transformers for the new 872 rectifier, complete plate power units. Rectifier Engineering Service, 4837 Rockwood Road, Cleveland, Ohio.

The finest in radio for amateur, broadcast and marine. The most modern short-wave receivers. Four to ten tube designs. Radiophone CW transmitters of any power or type. We make a complete line of apparatus, including speech amplifiers, filter coils, inductances, power units, etc. Any special apparatus, designs, built to order, using your parts if desired. Prices on request. New bulletin lists complete line of apparatus. Write for copy. Ensell Radio Laboratory, 1527 Grandview St., S. E., Warren, Ohio.

**AMATEURS**—experimenters, builders. We serve over 4000 I.R.E., A.R.R.L., etc., experimenters and "nuts." Full discounts. \$50,000 stock approved parts—no sets. Over four pounds catalog, circuits, data, prepaid, 50c. Weekly bulletins (new items, results of experiments, etc.), 20 weeks \$1. Sample experimenters' "Over the Soldering Iron" magazine, 25c. Transmitting data, price list, etc., 25c. Kladang Radio Laboratories, established 1920, Kent, Ohio.

**LEARN** Wireless (Radio) Morse telegraph. School, oldest and largest; endorsed by telegraph, radio, railway and government officials. Expenses low—can earn part. Catalog free. Dodge's Institute, 7 Wood St., Valparaiso, Ind.

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**CRYSTAL** holders \$3.50, ovens \$25. Build receivers, transmitters or power supplies. Smith, W2BRQ, 65 Glenwood Rd., Montclair, N. J.

**SELL**—1000 volt 500 watt Robbins and Myers motor generator 110-220 a.c., \$50. 1000 volt 250 watt Westinghouse motor generator, \$45. Kenneth Axline, Wenona, Ill.

**TRADE** 250 watt tube new, for motorcycle. Give full dope. Joseph Martonosi, 118 South Main St., South Bend, Indiana.

**WANTED**—Western Electric 211D tubes, will exchange 203A radiotrons for them. Wynne Radio Company, Raleigh, N. C.

**GREBE** CR13 eighty meter receiver never used, \$8. Zenith four tube BCL \$5. 350 volt motor-generator \$9. 500 cycle motor-generator with 1/2 h.p. drive, \$10. WE212D socket, \$3. Crystal holder, \$4.50. W9AS.

**WILL** trade Winchester 12 GA. automatic shotgun for xmitting apparatus. What have you? W6BRV, Route 2, Box 878, Modesto, Calif.

**FOR** sale—one t.p.t.g. Aero radiophone 7.5 watt xmitter complete with 500V plate supply unit and rectifier tube, \$55. One 5 tube broadcast battery receiver, \$12.50. One 3 tube s.w. receiver Aero coils in mahogany cabinet, \$15. 90V B half wave B eliminator with tube \$8.50. B A Raytheon tube \$2.50. 2400 meter coupler \$1.50. Mershon condenser new \$2.50. 3 tube broadcast receiver no cabinet, \$3.50. Hammarlund 11 P1 double spaced condenser \$1.50. Meters, miscellaneous radio parts. Want cash, physical or chemical laboratory equipment. W2SU, R. X. Daly, 35 Tichenor St., Newark, N. J.

**FOR** sale—National 4 tube S.W. Thrill Box receiver, \$14. J. L. Johnson, 354 College St., Macon, Georgia.

**SELL**—new Esco motor generator set 750V 227 mil. 1/2 horse 60 cycle a.c. motor mounted on steel frame, \$65. Cost \$110. Complete W8AYO 4 tube a.c. receiver as in April QST. Some outfit. First check for \$30 takes it. Don Farrell, W8DSP, 213 Hickok Ave., Syracuse, N. Y.

**TRADE** General Radio 224-L precision standard wavemeter for G.R. 452-C voltage divider and other apparatus. Paul E. Griffith, 45-B Quad., Iowa City, Iowa.

**SALE**—Ultradyne L2 with cabinet and tubes. R.C.A. 100A loud speaker. Best offer takes it. Aero 3 tube receiver. Other parts. Marcus Beekman, Natchez, Miss.

**W8QH** selling out. Aero 7 1/2 Watt CW transmitter complete. Aero two stage receiver. G.R. wavemeter. New Radio Correspondence Course with code, cost \$120. No haywire junk. Write for details.

**SWAP**—use Radiotron 203A for a 211, or a Radiotron 211 for a 203A. Riley Parsons, W8BXY, Old Forge, N. Y.

**KENNEDY** receiver 175-1000 meters with two stage amplifier \$15. One set Aero coils complete \$5. One National 4 tube Thrill Box \$25. Sherwood, W5BH, Albuquerque, New Mexico.

**HAMS**: Get our samples and prices on printed call cards made to order as you want them. W9APY Hinds, 19 S. Wells St., Chicago, Ill.

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Any type transmitter or receiver built to order. Workmanship guaranteed. For information write Midwest Amateur Radio Service, 309 E. 4th St., Ottumwa, Iowa.

**TRADE**—Remington auto-loading rifle, 22 long rifle calibre, like new. Want Teleplex, 210 power supply and filter, parts. W. H. Becker, 1307 Walton St., Houston, Texas.

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**SELL**—Supreme Radio Diagonometer, model 400B, price \$125. Elmer F. Moritz, 311 De Clark St., Beaver Dam, Wis.

**QSLs**, 100 two color \$1.00. Samples, W9CKA, Corwith, Iowa.

**WANTED**—August, September and December 1919 QSTs. John E. Phillips, 111 Grove St., New Haven, Conn.

**POWER** crystals—ground to your approximate frequency. Frequency stated accurate to .1 of 1%. Unconditionally guaranteed. 3500-kc. band, \$4.95, 7000-kc. band, \$6.95. Unfinished blanks, \$1. W2CCR, 157 East 89 St., New York City.

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**FOR** sale or trade, all the equipment in a 500 watt broadcasting station. What part of it can you use? Lowell Ecker, Sedan, Kansas.

**BARGAIN**—new Pilot super wasp shortwave receiver with power pack. Thirty dollars. E. N. Butz, 41 Brownell Ave., Hartford, Conn.

**MOTOR** generator set 650 volt generator, 32 volt motor, \$42. W9AVB.

**OSCILLATING** crystals, highest quality, \$2 up. Write W6BCX.

**TRADE** 900 cycle alternator and transformer for receiver or what have you? W7QK.

**QSL** cards, two colors, \$1 per hundred. Free samples. W8DTI, 257 Parker Ave., Buffalo.

**SELL**—UX852 in perfect condition, \$16. W8CED, Lansing, Mich.

**SHORTCUTS** to Code Reading Speed—any Govt. test—least time least effort bar nothing. Radio—Hispeed—Morse—Shortcuts \$5 each money order. Xmas special—December only—Hispeed FREE with Radio if requested with order. Hams and beginners using Radio report raised to 25 in few days—with Hispeed increased to 35 in few hours. Morse readily memorized—used without mixup. Reports from many users prove reading speed acquired easily—booklet on request. Dodge Radio Shortcut, Box 100, Mamaroneck, New York.

**110 Power** Unit \$27.50, supplies filament, plate and grid voltage for 210 oscillator and 250 modulator, also 227 amplifiers. Output 600v, very smooth, fine for 1931 phone. Nearly new. Cost \$55.00. Thordarson, Faradon, Dongan parts. With two new DeForest 481s. Also sell 3530KC Crystal Controlled phone set cheap. E. J. Bromley, W9CSM, Whitewater, Wis.

**SPECIAL**—Eight tube superheterodyne with interchangeable coils for wave lengths fifteen meters to two hundred meters. All General Radio parts receiver in solid walnut cabinet, worth \$50, will sell for \$25. Vibroplex heavy contacts \$25. Your price \$16. UX 250 new \$5. Acme, 003 30 Henry choke \$22.50, sacrifice for \$5. R.C.A. UP1627 50 Henry choke \$5. Pyrex leadin bow \$1.50 each. R.C.A. inductance \$3. James C. Gill, 710 W. Main St., Galion, Ohio.

**QSL** cards, message blanks, wall cards, stationery. Hillcrest, Cranestville, Pa.

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A.R.R.L. sweater emblems make fine Christmas gifts. They are made of best quality yellow and black felt with embroidered symbol, 5 x 8 inches. M. O. or currency only accepted. Price \$1.00. Eric Robinson, 135 Jefferson Road, Webster Groves, Mo.

POTTER Condensers: 2-mfd. 1000-test voltage \$2.50; 1-mfd. 2000-test \$2.50; 1-mfd. 2500-test \$3.25; 2-mfd. 2000 test \$4.00. Aluminum square-foot 85c; Lead 85c. "Ham-List" 2c. Curtis, 1100 Eighth Avenue, Fort Worth, Texas.

CASH for tubes, meters. WFMF, Kingman, Kansas.

10 watt xmitter, power supply. Jewell meters. For best offer. W9GKF, Early, Iowa.

THE HY-7, the outstanding shortwave super. First with: Space charging first detector, an adequately high amplifying frequency, the "pick-up" problem solved for shortwave supers, nearly equal tuning ranges, each oscillator coil doing double duty, and first to be prominently successful. 25c gets the latest dope and our catalog. Hatry & Young, Hartford, Conn.

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TRADE for best a.c. broadcast receiver offered or fifty bucks. Transmitter, 210 tube, coils, Jewell Hoyt meters, relay, Cardwell condensers, key, s.w. receiver, wavemeter, parts galore. Smith, 3001 Holdrege, Lincoln, Neb.

METERS, d.c. panel mounting, ranges: 10, 24, or 45 milliamperes, 10 or 60 amperes, \$3 each. 2500 volts at \$10. Jas. Coe, Box 151, Ft. Sam Houston, Texas.

SELL or trade — surplus apparatus. Radio Corporation dynamic speaker. Want Cardwell 147-B. Hosea Decker, Delaware, Ohio.

FOR sale — Silver Marshall a.c. short wave bearcat. Factory wires, tubes, speaker, coils, including broadcast only \$65. Used one month. W9FKW, 234 Littleton, Lafayette, Ind.

1-WATT tubes. Brand-new at \$1.00 each. These are rugged, thoroughly tested tubes. Renno Tube Co., 115 Newbury Ave., Atlantic, Mass.

SILVER-Marshall 737 Bearcat A.C. short wave receiver, wired, \$82.00 net; kit \$70.00 net. All S-M parts in stock 40% and 2% to hams. Write for our special price list on standard parts. Radio Inspection Service Co., 26 Allyn St., Hartford, Conn.

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PARTS for transmitters, power amplifiers. Tubes, switches, Magnavox dynamic speaker, air column speaker, lots of barnum. Must sacrifice station account college. Write your needs weekly. W3AGW, Edw. Mohl, 2201 N. Fourth St., Philadelphia, Pa.

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SACRIFICE — need money. Complete T.P.T.G. hundred-watt high-C; includes five meters: — 2.5 T.C.A., 500-0-500 M.A., 0-250 M.A., 0-15 V.A.C., 0-2,000 V.D.C.; two 211E's, one new, other used 38 hours; three .002-3,000 V. Faradons; two UC-490A 1 mfd. Faradons, 1,000 V.D.C. working, matched impedances; two newest type Potter 804, 1 mfd., 2,000 V.D.C. working; two 20-plate double-spaced Cardwells; three grid leaks; one PT537 RCA hundred-watt rheostat; one PR535 forty-watt rheostat; two new R3 Rectobulbs, used 38 hours; thousand-watt GE pole transformer, center-tapped, cleaned up, voltages up to 2,000-4,000; two home-made filament transformers, hundred, and forty watts respectively; Aero receiver, 1931 construction with monitor light, duplicate sets LWT 125 coils, in mahogany cabinet, two extra heavy duty Ray-O-Vac B's; new Prestolite eighty ampere-hour A.; monitor, all inside Hammarlund aluminum shield box; pair Baldwins; GR wavemeter; one 1-KW key; two type 10 tubes; one 110-2,000 V.A.C. Westinghouse voltage transformer, one 750-0-750 V.A.C. meter transformer — both excellent filter chokes; stand-off insulators; copper tubing; two boxes other standard high-grade stuff not needed in this transmitter. This equipment is not junk. Sell for \$120. Cost \$290. Inquiries solicited. Address Watson, Box 615, International House, Berkeley, California; after December 19, 1223 Olive Avenue, Long Beach, California. Set at Long Beach address.

ESCO motor generator, 32-10-500 volt, 200 watt, two units, four bearings, complete with starter. Perfect condition. Sell for \$45. WIANS, Milford, N. H., R.F.D. 2.

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W2CJY — George Rulfs, Jr., 166-37 89th Ave., Jamaica, N. Y.  
W4EA — J. H. B. van Weelden, Scottish Rite Cathedral, Mobile, Ala.  
W6AM-W6ZZA — Don C. Wallace, 4214 Country Club Drive, Long Beach, Calif.

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W1DF Geo. Grammer "hg."  
W1EH K. B. Warner "kb."  
W1ES A. A. Hebert "ah."  
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Thanks

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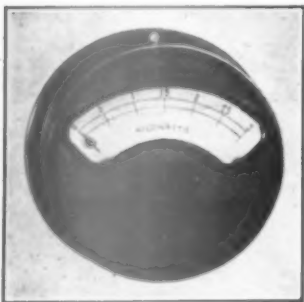
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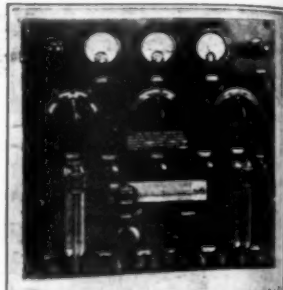


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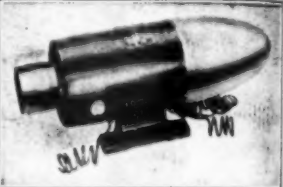


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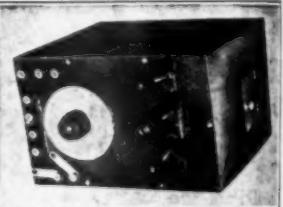
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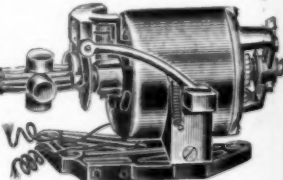
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